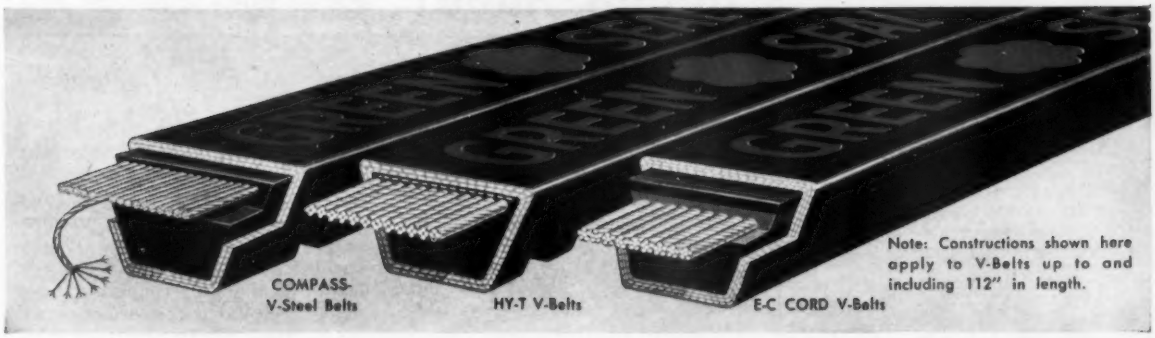
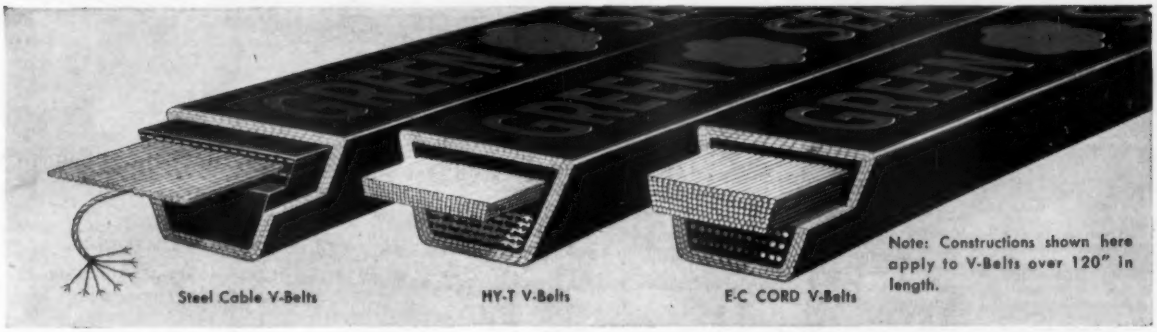
What's different about


COMPASS-
V-Steel Belts
HY-T V-Belts
E-C CORD V-Belts
Note: Constructions shown here apply to V-Belts up to and including 112" in length.

V-Belts with the Green Seal?



Plenty—when you're belting multiple drives. For that Green Seal certifies the dimensional stability of every belt that carries it. There's no surer guarantee that every belt in a set will match every other one—perfectly. And that they'll *stay* matched no matter how long you stock them before installation.

So the dimensional stability of Green Seal belts is solid protection against "loafing," slipping, stretching, scorching and other mismatching troubles. And most of the credit belongs to the belts' load carriers of airplane-type steel cables or Triple-Tempered (3-T) cord — Goodyear "exclusive" cord that's carefully tempered with Tension, Temperature and Time.

This unique 3-T process brings the synthetic cord to its point of greatest strength and stability. Result: the end of shrinkage in storage—plus greatest shock- and stretch-resistance in use. All of which assures you maximum, trouble-free horsepower hours at minimum cost. Why settle for less?

DIMENSIONALLY STABLE V-BELTS with the GREEN SEAL by GOODYEAR

THE GREATEST NAME IN RUBBER

The Goodyear Tire & Rubber Company, Dept. 794, Akron 16, Ohio

Please send me complete information on what makes V-Belts with the Green Seal different from any others made today.

Name_____

Company_____

Street Address_____

City_____ **Zone**_____ **State**_____

Compass, E-C Cord, Hy-T, Green Seal—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

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'ROUND ABOUT

with the editors in field and office

Edited by R. L. Marinello

Maintenance Refresher

PLANT ENGINEERS, maintenance supervisors and others concerned with maintenance problems will be interested in the three-day seminar to be conducted at the University of Wisconsin, Madison, Wisconsin. The seminar, Industrial Plant Maintenance, will be held from December 9 to the 11th.

Topics to be discussed include maintenance budgets, organization of the maintenance force, planning and scheduling, preventive maintenance, work simplification in maintenance and performance measurement of the maintenance department.

For registration or other information about this seminar, address your inquiry to Engineering Institutes, University Extension Division, The University of Wisconsin, Madison 6, Wisconsin.

It's Microfilm Time, Again

MICROFILM PRINTS of the 1956 issues of PLANT ENGINEERING, Volume 10, are now available for company files. The cost is $8.30, plus postage.

This volume or any of the previous volumes of PLANT ENGINEERING can be obtained from University Microfilms, Ann Arbor, Michigan.

Please note that distribution of these films are limited to firms and individuals on our controlled and subscription lists.

Air Moving Equipment Performance Rating Program

SPECIFIERS AND users of air moving equipment will be interested in the performance rating program planned by the Air Moving and Conditioning Association, 2159 Guardian Building, Detroit 26, Michigan. Such air moving equipment as centrifugal, axial and propeller fans and power roof ventilators will be covered in the program.

The program will provide a means of identifying products which have been properly tested and their performance accurately rated according to a uniform procedure set up under the AMCA Standard Test Code.

The job of inspecting and qualifying test laboratories all over the country and Canada, and checking test and performance data submitted by each manufacturer is now in progress. Target date for completion of this work and announcement of complete details of the program, including a list of approved test laboratories and names of participating manufacturers, is set for January 2, 1958.

Director of Engineering

Paul Jordan plant engineer at the Dodge Manufacturing Corporation since 1943, has been appointed director of engineering. In his new position he will report to David Firth, vice president in charge of engineering, and will be responsible for the direction of all the company's engineering and development work.

Jordan is credited with designing the new mechanized foundry at Dodge and has been the key figure in the recent plant expansion and improvement program undertaken by the company.

He is a graduate of Mishawaka High School and Purdue University where he received his B. S. degree in mechanical engineering. He came to Dodge in 1935 and was assigned to the material handling division of the engineering department. He was employed four years by the Western Supply Co. of St. Louis, Mo., prior to his employment at Dodge Manufacturing Corporation.

Gas Systems for Welding, Cutting

STANDARD FOR the Installation and Operation of Gas Systems for Welding and Cutting, 1957 edition, has been published by the National Fire Protection Association.

This standard deals with the installation and operation of all gas welding and cutting systems and covers all gases when used with oxygen

Subscriptions: U.S.A. $10, Canada $11. Other countries $12 per year. Single copies $1. Change of address: Send to PLANT ENGINEERING, Circulation Division, Barrington, Illinois. Please supply position title, company name, company address. Request must reach us by 15th of month to make the change effective with following month's issue. Published monthly and accepted as controlled circulation publication at Chicago, Ill.

Water goes to pieces in Atomic Power Plant!

$$2H_2O \xrightarrow{\text{radiation}} 2H_2\uparrow + O_2\uparrow$$

Water breaks up into hydrogen and oxygen! This is only one of the problems Nalco scientists have faced in planning water treatment with designers and builders of pressurized water nuclear power plants. There are several others which show, dramatically, that steam generation with nuclear fuel creates water treatment problems that are radically different from conventional steam generation . . . *And they also point up Nalco's program of keeping ahead in research and practical applied science.*

NATIONAL ALUMINATE CORPORATION

6273 West 66th Place • Chicago 38, Illinois

CANADA: Alchem Limited, Burlington, Ontario
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WEST GERMANY: Deutsche Nalco-Chemie GmbH
SPAIN: Nalco Espanola, S.A.

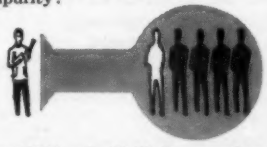
THUMBNAIL SKETCHES OF NUCLEAR POWER PLANT WATER TREATMENT ANSWERS

Water goes to pieces — Excess hydrogen in water helps stabilize shaky water molecules.

Ammonia and nitric acid form in boiler water — Control dissolved gas concentrations in water.

"Hungry" water attacks stainless steel—Chlorides and dissolved oxygen in water accelerate stress corrosion cracking under nuclear plant conditions: keep 'em out!

WANTED: Water of 99.99995% — or better — purity — Nalcite mixed-bed demineralizers, operating as hydrogen-hydroxyl exchangers will keep nuclear power plant water at or below 0.5 ppm impurity!



Nearly 1/5th of all Nalco employees are laboratory personnel!

Real emphasis on research, development and testing activities is a primary reason why Nalco is able to solve, *successfully*, the problems of water treatment for nuclear power plants . . . And to offer a continually improving and expanding variety of specialized chemicals and services for the needs of industry.

THE *Nalco*® SYSTEM . . . SERVING INDUSTRY THROUGH PRACTICAL APPLIED SCIENCE

WATER TREATMENT . . . PAPER MILL PROCESS CHEMICALS . . . REFINERY CORROSION CONTROL . . . ION EXCHANGE . . . WEED & BRUSH CONTROL . . . SLIME & ALGAE CONTROL . . . PROCESS ANTIFOAMS & COAGULANTS . . . PETROLEUM CATALYSTS . . . COMBUSTION CATALYSTS . . . FUEL OIL STABILIZATION . . . CHEMICAL INTERMEDIATES . . . CONSULTING SERVICES

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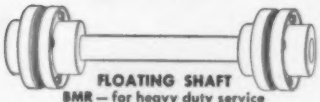
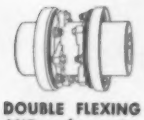
FOR MAINTENANCE FREE POWER TRANSMISSION
Specify
THOMAS
FLEXIBLE COUPLINGS

DOUBLE FLEXING
DBZ — for high speed, heavy duty drives



FLOATING SHAFT
BMR — for heavy duty service with excessive misalignment



DOUBLE FLEXING
AMR — for engine and medium speed drives

SINGLE FLEXING
SS — for engine-driven generator sets with out-board bearings

Thomas' 40 years of flexible coupling experience is at your disposal to help you meet ordinary applications or special variations for unusual cases.

UNDER LOAD and MISALIGNMENT ONLY THOMAS FLEXIBLE COUPLINGS OFFER ALL THESE ADVANTAGES.

1 Freedom from Backlash Torsional Rigidity
2 Free End Float
3 Smooth Continuous Drive with Constant Rotational Velocity
4 Visual Inspection While in Operation
5 Original Balance for Life
6 No Lubrication
7 No Wearing Parts
8 No Maintenance

Write for Engineering Catalog 51-A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U. S. A.
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'ROUND ABOUT

for welding, cutting, heating and heat-treating operations. It also provides for the safe storage of calcium carbide and gases used in these processes. In its revised form, the standard more clearly defines limitations for the storage of calcium carbide.

This 28 page standard, NFPA No. 51, priced at 50 cents, is available from the National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.

Safety Code for Standpipe and Hose Systems

THIS NEW safety code reviews the various services performed by a standpipe and inside hose system. Specific guidance is provided for periodic inspection of all components in the system. Instructions for maintenance of hose, couplings, nozzles and playpipes is included.

The booklet, "Inspection, Maintenance and Protection of Standpipe and Inside Hose Systems" is available from the Fire Equipment Manufacturers' Association, Inc., One Gateway Center, Pittsburgh 22, Pa.

Instrument Short Course

SEVENTH ANNUAL Instrument Short Course will be held January 30 and 31 at the Los Angeles Harbor Junior College, Wilmington, California.

The course will cover three phases of instrumentation: technical papers, practical methods and exhibits. The papers will cover basic fundamentals, measurement, application problems and advance techniques of both pneumatic and electronic instruments as applied to flow, temperature and pressure regulation. Practical methods will discuss the maintenance and calibration of instruments and control devices.

Further information about this course may be obtained from Thomas H. Ponton, Chairman, Seventh Annual Instrument Short Course, Southern California Meter Association, 10219 Orange Avenue, South Gate, California.

Test Results of Radioactive Tracer

TESTS OF THE uses of the radioactive tracer displacement technique are described in a report of Air Force-sponsored research.

The technique is based on displacement of a radioactive or dye tracer from a tube. The report describes application of the tracer technique to fluid dynamic studies in tubes of one-half and one-inch diameter. Conditions of the test were: turbulent flow in smooth tubes, laminar flow in artificially roughened tubes, laminar flow with superposed fluid vibration, non-Newtonian flow at low velocities and flow accentuating mass transfer effects.

This illustrated report, PB 121652, Boundary Layer Radioactive Tracer Technique, Part 2—Application, may be ordered from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. It contains 61 pages, and the price is $1.75.

From Plant Engineer to Veep

James R. Flanagan, formerly plant engineer at S. F. Whitman & Son, Inc., and later plant manager, has just been elected to the position of Vice President in Charge of Manufacturing.

He has been with the company for 27 years in various capacities in the plant. In his new position, he will report to Mr. Sharp, Executive Vice President, and he will be in complete charge of the following divisions: Production; Production Control; Industrial Relations; Order Packing, Shipping and Warehousing; Package Design; Engineering; and Inspection.

Mr. Flanagan is a member of the Philadelphia Chapter of the American Institute of Plant Engineers.

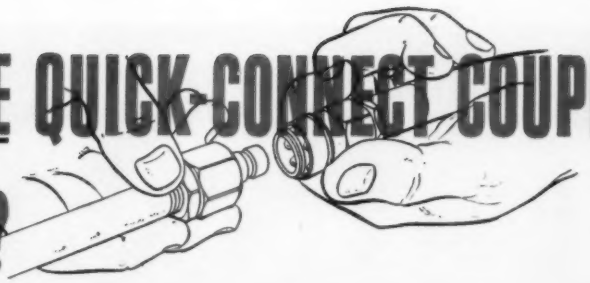
Teach the Teachers First

INDUSTRIAL PLANTS in the Los Angeles area are trying a new tack in training programs for upgrading unskilled and semi-skilled workers. An industry committee consisting of six members from local screw machine products firms realized that the educational program could only be as good as its teachers.

With this thought in mind, the committee set up a school for "teachers." Students for the course were recruited among experienced screw machine foremen and operators. The teacher applicants were given a three-hour per week, 20 week course of instruction in the latest teaching methods. When they are finished with the course, they will teach industrial students a four-semester course of instruction in screw machine theory and operation.

For more information about the training program, address your inquiry to National Screw Machine Products Association, 2860 E. 130th St., Cleveland, Ohio.

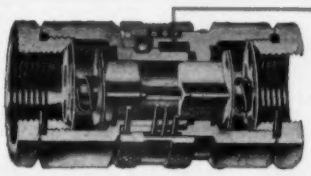
WHICH SNAP-TITE QUICK-CONNECT COUPLING IS BEST FOR YOU?



SNAP-TITE "H" COUPLING . . . . . FOR HIGH PRESSURE APPLICATIONS

FOR HYDRAULIC OR AIR

"H" Coupling for high strength, higher efficiency, high-resistance to heavy line surge. Sizes: ⅛" thru 12". Bulletin No. 240

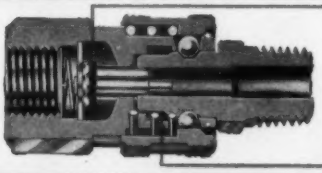


Exclusive U-packer gives a positive seal without compression set because of rubber distortion. Line pressure inside the U-packer keeps it open and forced against its metal backing—the higher the pressure, the tighter the seal.

SNAP-TITE HI-FLOW COUPLING . . . FOR LOW PRESSURE APPLICATIONS

FOR AIR AND FLUIDS UP TO 150 p.s.i.

Hi-Flow is recommended to connect small air tools to plant air system, and for low pressure fluid transfer in small lines. Sizes: ⅛" thru ¾". Bulletin No. 230

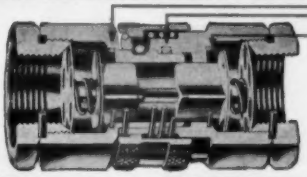


Bonded valve washer
(pat. pending on valve construction)

Exclusive U-packer

SNAP-TITE "HK" COUPLING . . . . . FOR HARD TO HANDLE FLUIDS

FOR FUMING ACIDS, ALKALIES, SOLVENTS, AND HIGH PRESSURE STEAM . . . "HK" is the only coupling now on the market for fluid temperatures from —100° F to +500° F . . . and for live steam up to 460° F. Its seals are made of Teflon for which there is no known solvent. Sizes: ½" thru 3". Bulletin No. 270



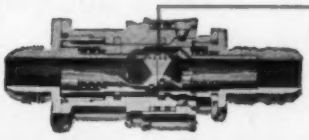
Teflon Valve Seal

Teflon Nipple Seal

Teflon Valve Seal

SNAP-TITE NO-SPILL COUPLING . . . FOR MINIMUM AIR INCLUSION

FOR AIRCRAFT, MISSILE HYDRAULIC, FUEL SYSTEMS which cannot stand air in the lines, and for transmitting fluids which *must not spill*, the Snap-Tite no-spill coupling is recommended. Bulletin No. 280

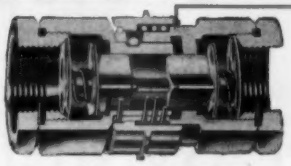


Flush valves prevent spillage, air inclusion. Snap-Tite will engineer special variations to your requirements.

SNAP-TITE "E" COUPLING . . . . . FOR VACUUM and VERY LOW PRESSURE

FOR VACUUM SYSTEMS IN THE MICRON RANGE

"E" Coupling performs in the *micron* range in the smaller sizes both connected and disconnected. Recommended, too, for gravity flow . . . U.L. approved for LP Gas. Sizes: ⅛" thru 12". Bulletin No. 250



Nipple seals in coupler by depressing the lip of the E packer and slightly compressing the body of the packer. This new E-packer gives positive seal under high-pressure, low-pressure, and vacuum.

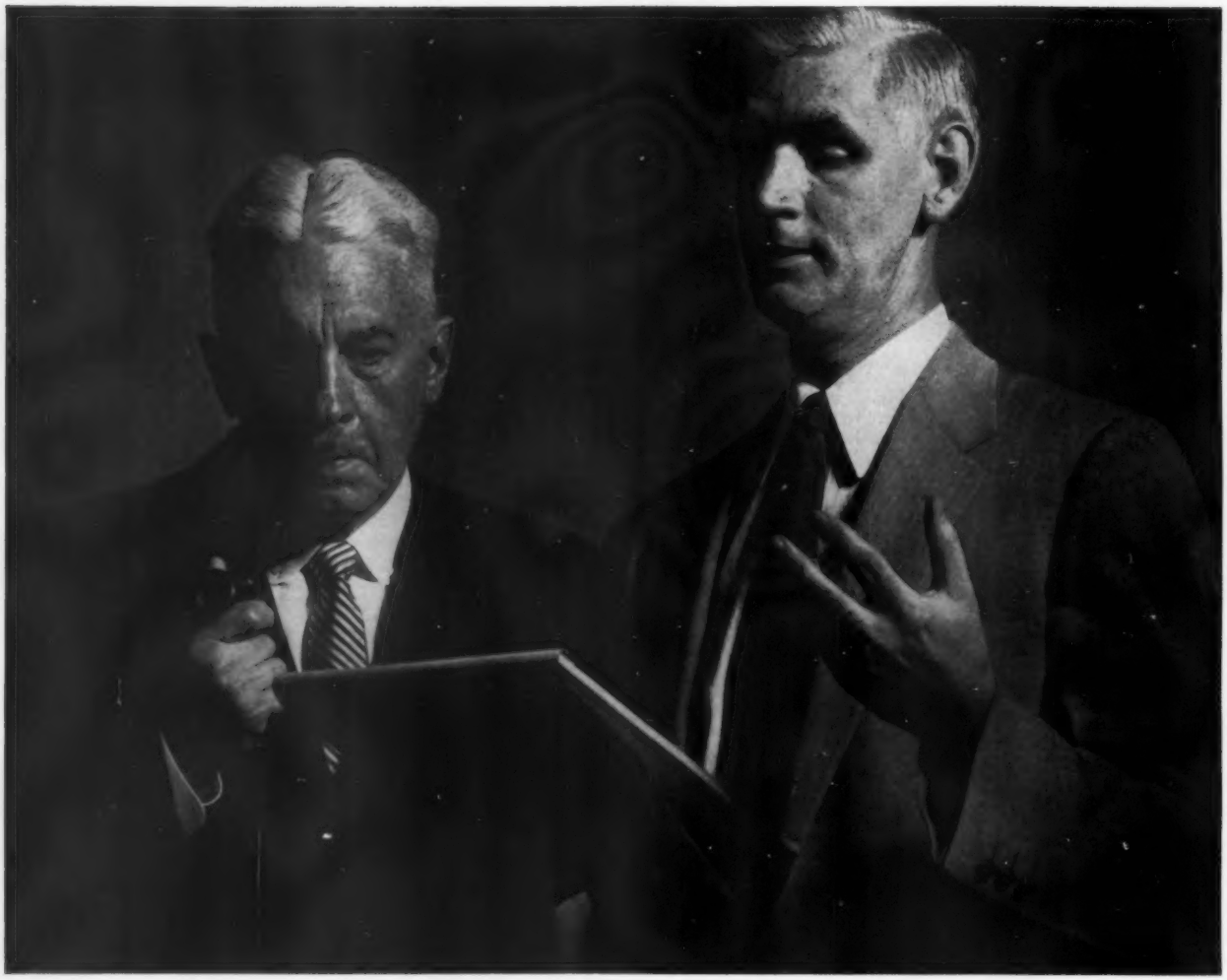
Snap-Tite Couplings are available plain, (without valves), and with either single or double shut-off. Couplings normally furnished in alloy steel, but all (except hi-flow) are also available in brass, aluminum, or stainless steel with a variety of finishes.

SNAP-TITE, INC., UNION CITY 5, PA.

Snap-tite

SNAP-TITE COUPLINGS CAN HANDLE ALMOST ANYTHING THAT FLOWS

For more facts circle 505 on Reply Card



"Let's back-up production forecasts with...

5 steps for power system protection!"

Perhaps in your plant too, all the angles have been figured to forecast sales and production growth . . . *except electrical system planning!* But how often have you heard "any addition of machinery here would overload our distribution system." Or — "we have to shut down this department to make electrical repairs."

When 63% of the plants in the country have questionable breaker interrupting capacity, you can't afford the risk of not surveying electrical adequacy as a part of forecasting growth. A single major outage might cost much more in lost production — material spoilage, and possible injury to personnel or equipment. The cost of adequate system protection is nominal, when you consider that a modern power distribution system represents only 5 to 15% of the total plant investment.

Take these steps to protect growth forecasts by pinning down electrical system safety. Your local Westinghouse sales engineer will be glad to help.

STEP 1 Project total connected load for at least 5 years.

STEP 2 Determine percent of transformer capacity in use today — needed in 5 years.

STEP 3 Check main circuit breaker adequacy for faults today — in 5 years.

STEP 4 Plot the balance of load on primary and secondary feeders, for today — for next 5 years.

STEP 5 Rate feeder circuit-breaker protection, for today, and next 5 years.

YOU CAN BE SURE...IF IT'S

Westinghouse

There's profit in planned power ——→

POWER-UP with Westinghouse...

guard production and personnel with this proof of long range safety

DESIGN TESTED AND VERIFIED in the Westinghouse HIGH POWER LABORATORY

You'll find proof of long range safety is a key to gaining acceptance for your electrical growth plans. Westinghouse engineers help you provide such proof in two ways; 1) extensive apparatus testing, and 2) experienced electrical system counseling.

At Westinghouse High Voltage Testing Laboratory (above) equipment designs are thoroughly checked for both mechanical functioning and maximum electrical capacity. Thus you can be sure that maximum fault current ratings for vital main breakers, for example, have been accurately determined . . . not guessed at.

Selecting the proper electrical distribution system is most important, as it sets the pattern for your power planning. Years of counseling with all types of companies enables Westinghouse engineers to help you consider all the facts and coordinate equipment for an efficient, flexible plan. There's profit in planned power — particularly if its Westinghouse.

MP-3055

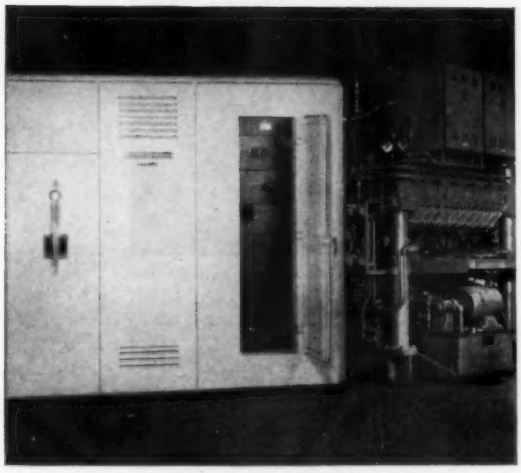
Characteristics of Distribution Systems

TYPE OF SYSTEM	Flexibility	Service Continuity	Regulation	Efficiency	Operation and Maintenance Cost	Initial Investment
Modern Simple Radial	F	F	D	C	A	A
Primary-Selective Radial	D	D	D	B	A	B
Simple Network	A	A	A	C	B	E
Simple Spot Network	C	A	A	D	D	E
Primary-Selective Network	A	A	B	A	C	D

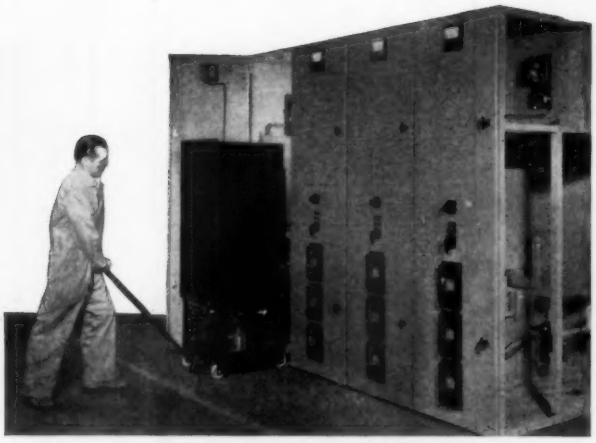
LEGEND: A...91-100% B...81-90% C...71-80% D...61-70% E...51-60% F...41-50%

Approximate relative standing of five basic distribution systems. For detailed analysis of your system, consult your Westinghouse salesman.

YOU CAN BE SURE...IF IT'S Westinghouse

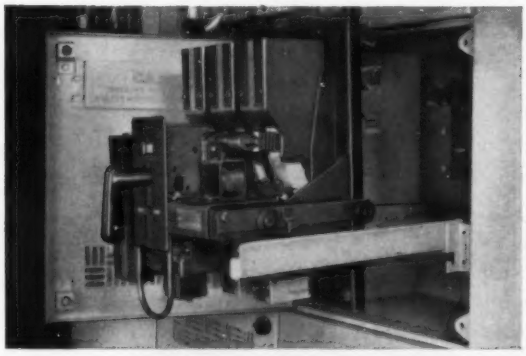


With Westinghouse dry-type power centers you can bring the economy of hi-voltage into production spaces with full safety. They're 25-40% lighter than liquid filled, eliminate fire hazards, easily mounted overhead.



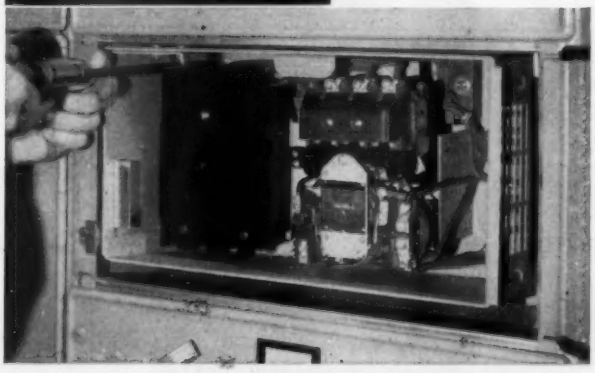
In Westinghouse standardized metal-clad switchgear design, you'll find complete personnel safety in operating and servicing. DH De-ion* breakers draw out horizontally, quickly and easily, thus facilitating inspection and maintenance. Breaker units in the same voltage classes and ratings are interchangeable.

*Trade Mark



Westinghouse low voltage DB circuit breakers, in a complete line of ratings, provide maximum protection in less space. They contain a multi-purpose tripping device to prevent false shutdowns. It provides 1) delayed tripping on temporary overloads, 2) trips on larger overloads. 3) trips instantly on short circuits.

New Westinghouse Control Center featuring both 9-½ and 14 inch modular units, centralizes control and enables faster servicing in the event of an outage . . . provides personnel protection. Neoprene gasketing and rolled edge doors to provide structural strength and protect against dirt and fumes. Tested unit baffling localizes any fault.

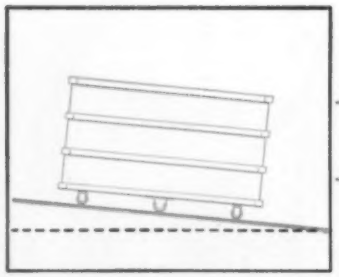


New Westinghouse Ampgard* High Voltage Starter coordinates overload, short circuit, and personnel protection on large AC motors up to 3000 hp-4800 volts. BAL fuses provide fault interrupting capacity to 250,000 Kva.

*Trade Mark

For more facts circle 506 on Reply Card

4th FLOOR *SPINNING ROOM*



Platform *tilts* as elevator doors open when car has been "DISPATCHED" for unloading

Elevator platform tilts for automatic unloading

Truck starts to roll forward

Truck continues to roll forward

Truck picks up momentum on landing incline

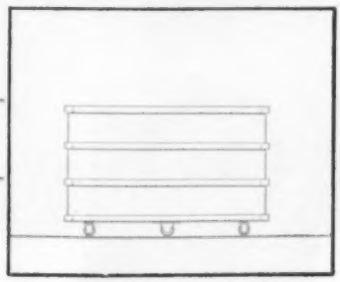
BOBBIN TRANSFER Freight Elevator

Elevator platform is tilted to unload trucks automatically

Elevator is dispatched as soon as loaded

Elevator loading begins immediately

Elevator platform remains level



Platform *stays level* as elevator doors open when car arrives "ON CALL" for loading

1st FLOOR *WEAVING ROOM*

OTIS ELEVATOR COMPANY • 260 ELEVENTH AVENUE • NEW YORK 1, N.Y.

TILTING PLATFORM

on automatic Otis Freight Elevators saves cost of operators at Bemis

The BEMIS BRO. BAG CO. COTTON MILL, Bemis, Tennessee is a typical cotton mill. It spins on the 4th floor and weaves on the 1st floor. It also has a typical cotton mill problem. Bobbins have to be moved continually between the 4th and 1st floors. The traffic flow is constant but not intensive enough to warrant the expense of freight elevator operators.

BEMIS has a "bobbin" transfer elevator at each end of its mill.

To provide better service and eliminate the cost of six elevator operators, OTIS, working with BEMIS designed an automatic elevator with a tilting platform. Its operation is explained at the left.

Here's the sequence of "bobbin" transfer: When the "doffer", who is the employee that takes the full bobbins off of the spinning frames on the 4th floor, gets a full box he takes it to the elevator and presses the "CALL" button for the 4th floor. If the elevator is already there the hoistway doors and car gates open and he loads the box or boxes into the car. He then closes the power-operated doors and gates by means of the door close button located outside. He next dispatches the car to the 1st floor. When the car arrives the doors and gates open and the platform tilts and rolls the boxes out of the car. Boxes are returned from the 1st floor to the 4th floor in the same manner.

An important working feature is OTIS automatic self-leveling. Elevator and floor platforms must be accurately aligned because of the small wheels on the bobbin trucks. Otherwise the free roll-off would be affected.

All freight elevators at BEMIS' plants in Bemis, Tenn. and Talladega, Ala. are under OTIS Maintenance. They're kept running at their original efficiency for a fixed monthly charge. There's never an unexpected, expensive repair bill. All replacements of wearing parts are included in the basic OTIS Maintenance Plan.

FREIGHT ELEVATOR
maintenance
that keeps freight elevators running like new

Otis
"ENGINEERED SERVICE BY THE MAKER"

OFFICES IN 297 CITIES ACROSS THE UNITED STATES AND CANADA

For more facts circle 507 on Reply Card

compact . . . power-packed

New General Electric

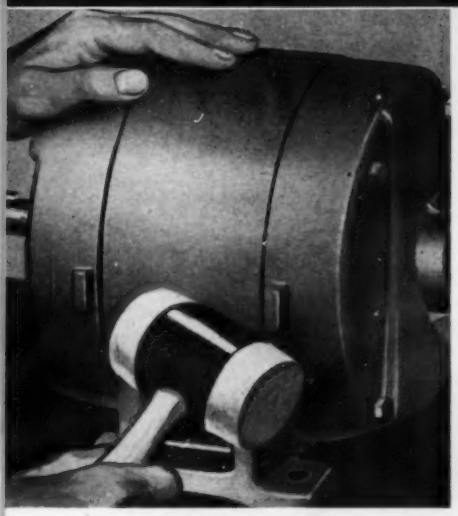
NOW EASIER

COMPLETE LINE AVAILABLE

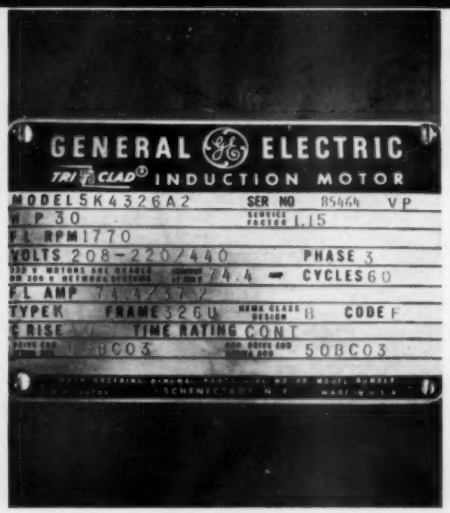
TRI 55 CLAD Motors are...

TO MAINTAIN

THROUGH 125-HORSEPOWER



FAST END-SHIELD REMOVAL is possible because of Tri-Clad '55' motor's rugged knock-off lugs. Remove four bolts, tap on knock-off lugs and end-shield is off to permit easy repositioning or quick motor inspection.



EASIER TO MAINTAIN, Tri-Clad '55' motors utilize a stainless-steel, non-corrosive nameplate to give complete rating information including AFMBA bearing numbers. Separate steel plate gives connection diagrams.

EASIER TO INSTALL, Tri-Clad '55' motors use Perma-numbered leads to simplify wiring, speed motor hook-up. Numbers are stamped on terminals and printed on every half-inch of Geoprene® leads.

immediate shipment . . . all ratings

The need for faster production schedules and reduced production costs has made motor maintenance of prime concern to motor users. Modern motors must be easy to inspect and maintain without loss of production time due to routine maintenance.

TO MEET THIS NEED, G-E Tri-Clad '55' motors feature an oversize grease reservoir which contains enough grease for normal 5-year operation. Yet, new grease can be added while the motor is running. Other easy maintenance features are described above.

EASE OF MAINTENANCE, however, is not the whole Tri-Clad '55' motor story. Experienced G-E motor engineers have used revolutionary materials and the most modern production and testing facilities to provide a motor that is not only easier to maintain, but also more reliable and easier to install.

Formerly available only to 30-hp, these proven Tri-Clad '55' motors are now available for immediate shipment—usually from nearby warehouse stocks—up through 125-hp.

FOR FULL INFORMATION on the complete Tri-Clad '55' motor line contact your nearest G-E Apparatus Sales Office or Distributor.

Section B891-7
GENERAL ELECTRIC COMPANY
Schenectady 5, New York

Please send me the following publications:

☐ **FREE BULLETIN (GEA-6602) describes advanced features of new Tri-Clad '55' motors through 125-hp.**

☐ **FREE SLIDE RULE (GEN-148) to determine weight and space-saving benefits of new Tri-Clad '55' motors.**

NAME _____

TITLE _____

COMPANY _____

ADDRESS _____

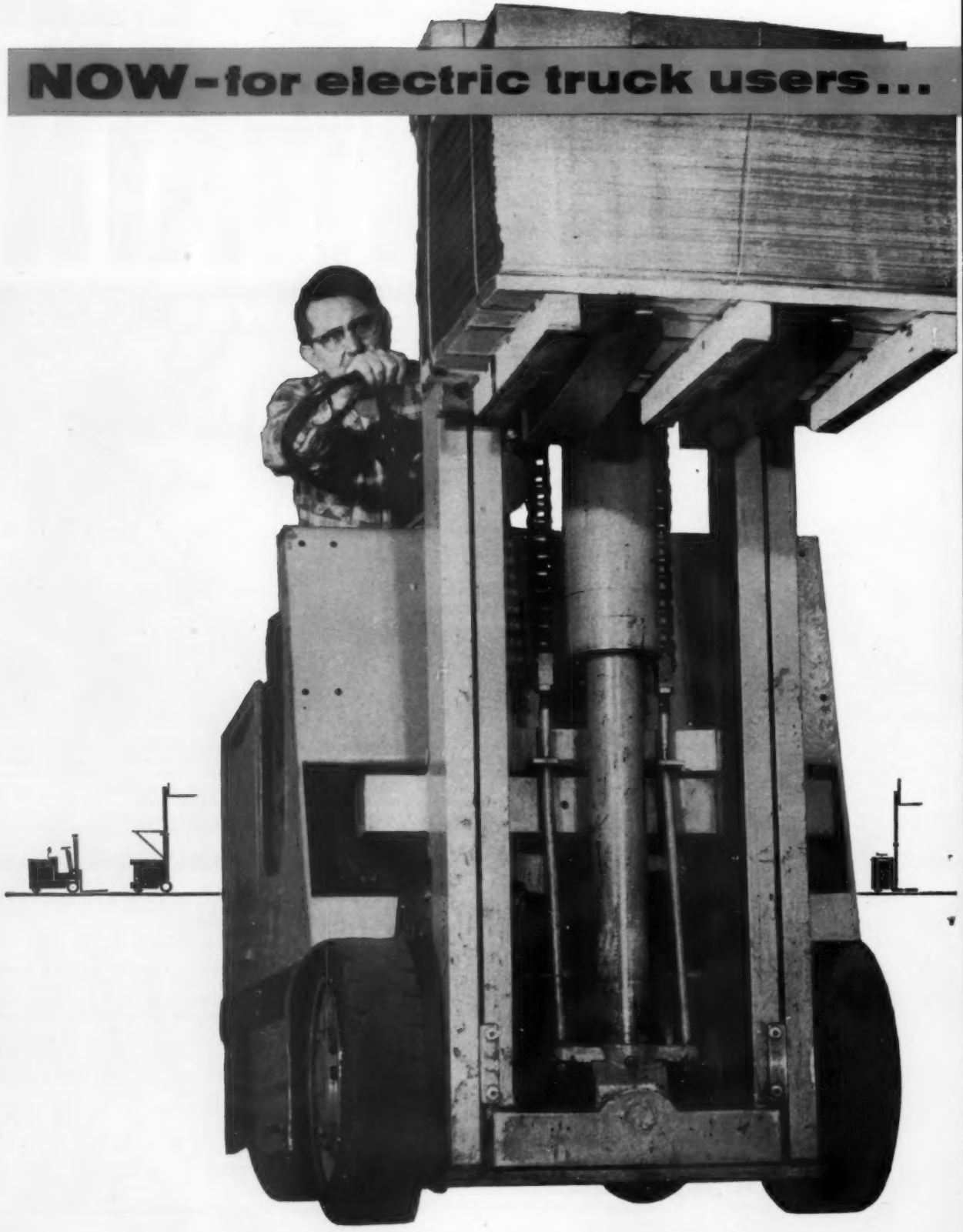
CITY & STATE _____

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 508 on Reply Card

NOW–for electric truck users...



BATTERIES FOR INDUSTRIAL TRUCK • DIESEL STARTING • RAILROAD

2 NEW batteries from C&D!

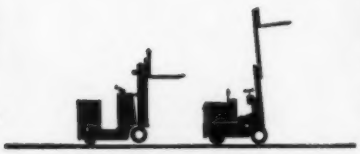
Get extra life, extra capacity for every make and style truck with C&D *Slyver-Clad*® batteries

You get extra capacity—yes, and extra life, too—when you use C & D's proven *Slyver-Clad*® batteries!

Electric trucks powered with these remarkable batteries work through the longest shifts and move the most material before recharging—thanks to C & D's Five-Fold *Slyver-Clad* construction. This exclusive method of insulation retains the active materials on the plates, and assures maximum capacity throughout the long, useful life of the battery.

Famous *Slyver-Clad* construction is not new. It is the only time-tested construction proven to be responsible for increasing the capacity available per unit of space, and *simultaneously* increasing the life of batteries over the last decade.

Why be satisfied with less than the best. Specify *Slyver-Clad*—the premium battery for Motive Power Service.



For low silhouette trucks—Type CMS—From 6 cells up—55 A.H. per positive plate—Capacities from 220 to 880 at the 6 hour rate—A new, low battery for the low silhouette trucks—Provides 55 A.H. per positive plate where 40 A.H. has been the standard.

For rider trucks—Type HC—From 6 cells up—Minimum of 72 A.H. per positive plate on delivery—Capacities from 288 to 1152 at the 6 hour rate—Sets a new standard for battery capacity for standard rider type trucks.

The better battery buy is

C&D BATTERIES, INC.

of Conshohocken, Pa.

SINCE 1906

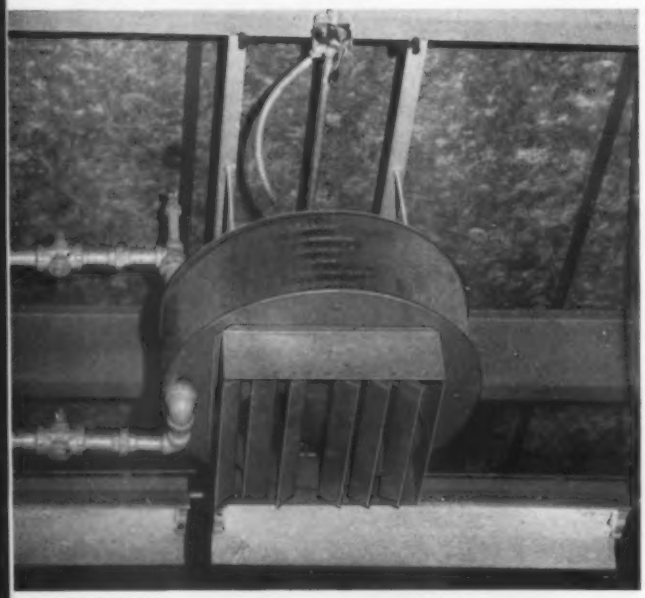
SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

CARLIGHTING AND AIR CONDITIONING • TELEPHONE • CONTROL AND AUXILIARY POWER

For more facts circle 509 on Reply Card

For more facts circle 510 on Reply Card →

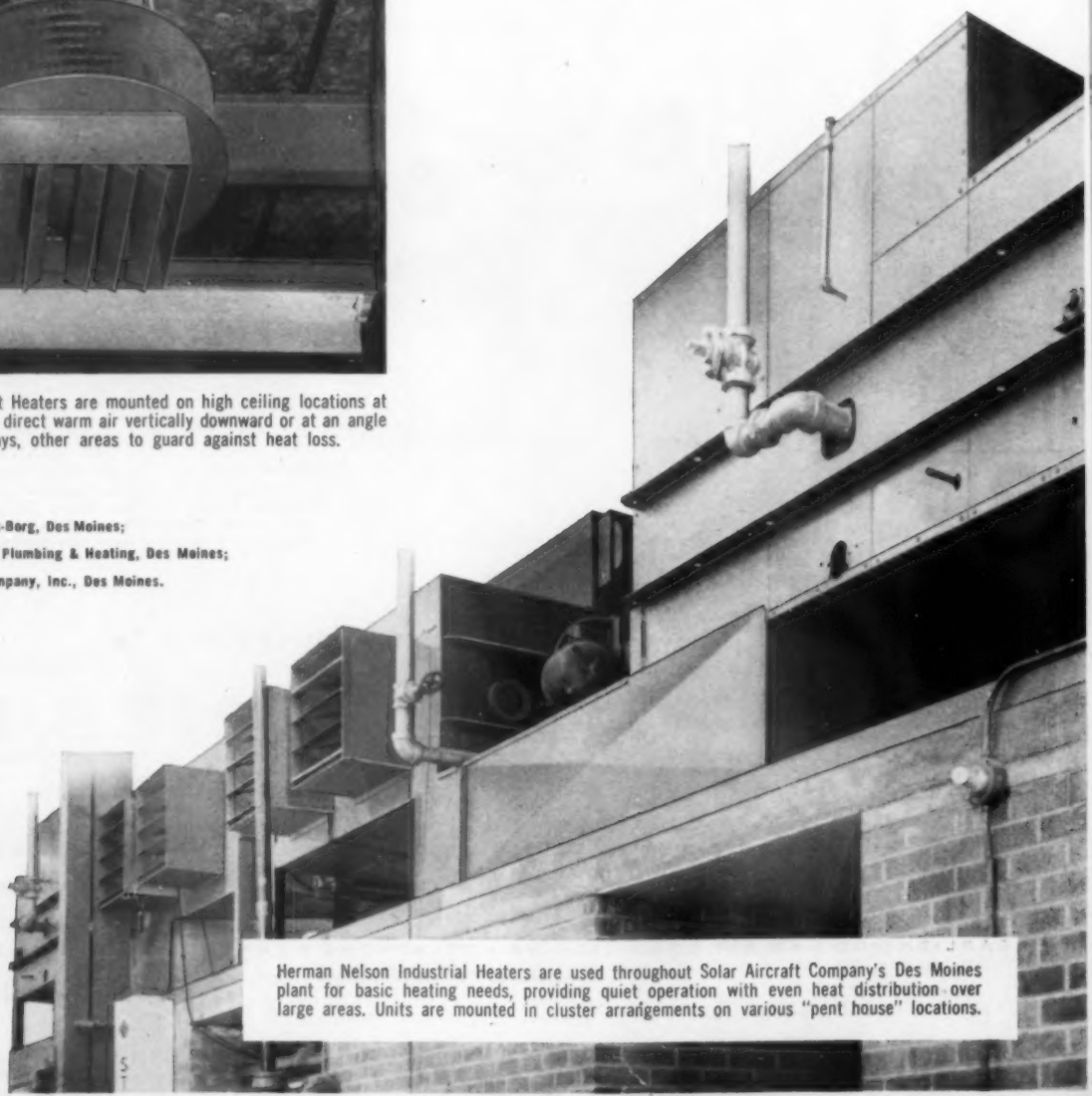
exactly what Solar Aircraft Company the Herman Nelson **department store** of **ventilating equipment !**



Herman Nelson Vertical Unit Heaters are mounted on high ceiling locations at Solar's Des Moines Plant to direct warm air vertically downward or at an angle near loading docks, doorways, other areas to guard against heat loss.

From the vast Herman Nelson line, it was easy for Solar Aircraft Company to choose just the *right* units, in the *right* capacities, needed to solve all heating problems at its huge Des Moines plant. Solar, with headquarters at San Diego, California, is a major supplier of heat resistant alloys to the aircraft industry. It is typical of the many top-flight manufacturers that look to Herman Nelson for precision performance, guaranteed results in heating and ventilating.

Architects & Engineers—Brooks-Borg, Des Moines;
Mech. Contractor—M. A. Welin Plumbing & Heating, Des Moines;
Gen. Contractor—The Weitz Company, Inc., Des Moines.



Herman Nelson Industrial Heaters are used throughout Solar Aircraft Company's Des Moines plant for basic heating needs, providing quiet operation with even heat distribution over large areas. Units are mounted in cluster arrangements on various "pent house" locations.

needed from

heating and

AAF herman nelson

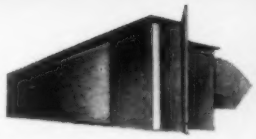
American Air Filter

Company, Inc.

228 Central Avenue, Louisville 8, Kentucky

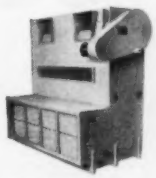
BETTER AIR IS OUR BUSINESS

Horizontal Unit Heater Available in 18 sizes, designed for ceiling suspension and also to use either steam or hot water. Quiet operation; compact design. Catalog No. 700.

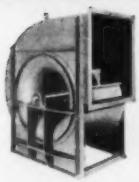


Roll-O-Vent Air handling units that change their own filters automatically. Media loads like a camera, lasts up to a year. Catalog No. 780A.

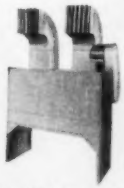
Vertical Unit Heater For high ceiling installations. Discharges air vertically downward or at angle to vertical in various directions. Steam or hot water. Catalog No. 700.



Air Conditioning Unit New type air-conditioning units for low cost commercial and industrial applications. Delivers up to 15,000 cu. ft. clean, cooled air per min. Catalog No. 785.

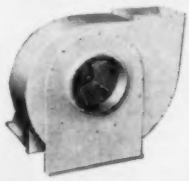


Centrifugal Fan Available in either slow speed or non-overloading types; 17 wheel diameters from 12¼" to 73"; 8 arrangements for direct or belt drive. Catalog No. 850.

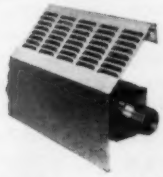


Industrial Heater Replaces exhausted air, balances minus pressures. Big capacity – does the job of many smaller, propeller-type units. Catalog No. 750.

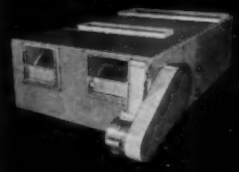
Unit Blower Years-ahead features in new "packaged" Unit Blowers. Compact, spacesaving, easy to service. Wide range of unit sizes. Catalog No. 826.



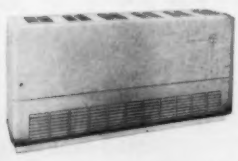
Industrial Exhauster Exclusive hub assembly cuts maintenance & replacement costs. New impeller design; heavy duty shaft & bearings. Catalog No. 860.



Finned Radiation Available steel fins on steel tubing or aluminum fins on copper tubing. Light-weight, suitable for exposed or concealed installation. Catalog No. 790.



Heating & Ventilating Unit Hangs on ceiling, out of the way, or mounts on wall or floor. Quiet operation, slow speed, with completely rotable fan sections. Catalog No. 775.



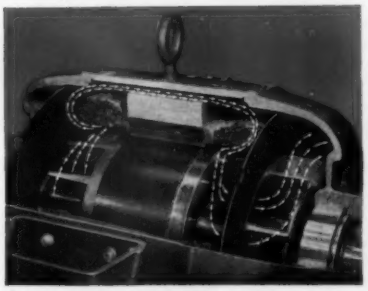
Console Heater 16 models – 64 air inlet-outlet arrangements. Fully-recessed, semi-recessed or free-standing applications. Smartly designed. Catalog No. 727.

Propeller Fan Operates horizontally or vertically; belt or direct drive. Wide range of sizes in both types. Capacities to 36,150 CFM. Low operating cost. Catalog No. 800.

NEW ROBBINS "SERIES 254U" RE-RATED FIVE BIG

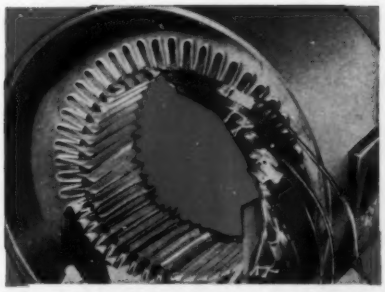
FULL HEIGHT END HEAD PROTECTION
One piece shrouded end heads give full height protection against moisture and falling objects. Internal baffles complete splash-proof construction.

& MYERS MOTORS offer you... ADVANTAGES!



"STRAIGHT THROUGH" DUAL-SWEEP VENTILATION ELIMINATES "HOT SPOTS"

Tandem fans, one pushing and the other pulling, produce washing action around and over field coil ends, insure lower internal temperatures and longer dependable operation.



MYLAR* INSULATION INCREASES MOTOR LIFE. Mylar*, laminated to rag paper insures positive insulation and assures virtually permanent protection because of its excellent dielectric qualities. In addition, the rag paper backing provides a cushioning effect for added resistance to abrasions and punctures.

*DuPont registered trademark.

BEARINGS EASILY INSPECTED

Removable cover plate at each end of head permits easy bearing inspection without dismantling motor. Bearings run in double-width races, thus have extra-large reservoirs containing grease selected to resist dust, temperature, humidity and high operating speeds.

PERMANENTLY NUMBERED LEADS SIMPLIFY INSTALLATION AND MAINTENANCE

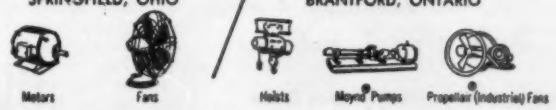
Proper lead identification is assured even after years of exposure. Numbers are permanently impregnated into the sub-surface of the insulation . . . can't wear off or deteriorate.

THESE five big advantages make R&M's "Series 254U" re-rated motors your best buy for applications requiring dependable, full-time performance. They can be installed in any environment, outdoors without a cover or in damp and corrosive atmospheres. Moisture, rust or corrosion can't affect their operation, and they take rugged duty in stride! Every R&M motor is electrically and mechanically designed to withstand the most severe operating conditions. Careful quality control and precision manufacture insure top performance and dependability year after year. Write today, for R&M Bulletin 520PEon R&M's "Series 254U" re-rated motors!

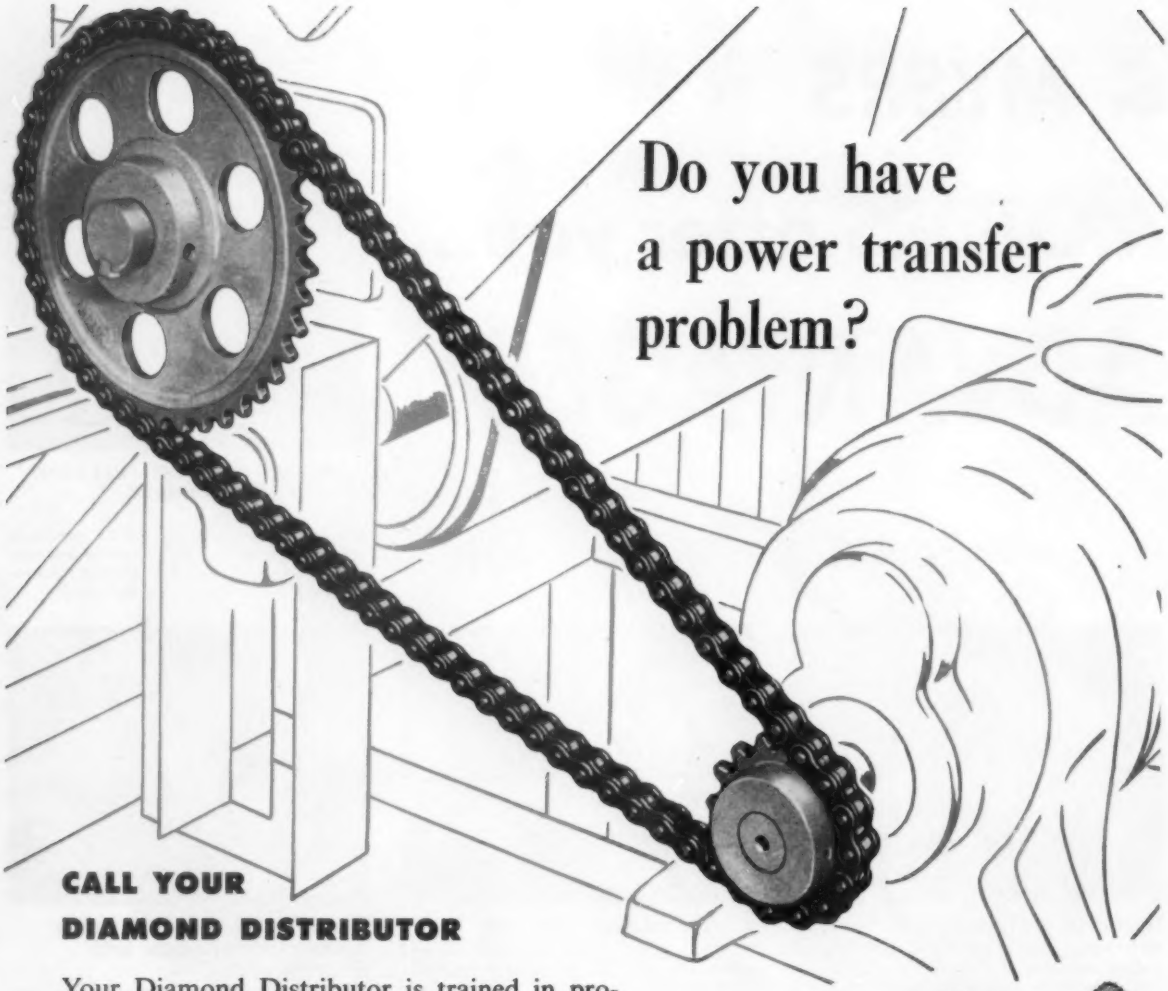
R&M

ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONTARIO



For more facts circle 511 on Reply Card



Do you have a power transfer problem?

CALL YOUR DIAMOND DISTRIBUTOR

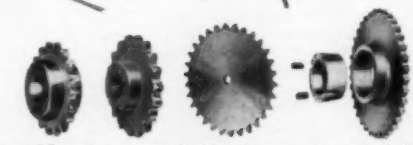
Your Diamond Distributor is trained in providing Diamond Roller Chain drives to meet the toughest kind of specifications and requirements.

He carries stocks of Diamond roller chains, sprockets and couplings to give you quick service. His roller chain application experience can improve drive performance, efficiency and save you money.

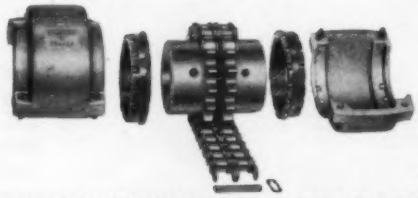
Call your Diamond man now. His name is in the classified section of your local telephone directory under the heading **CHAINS** or **CHAINS-ROLLER.**

DIAMOND CHAIN COMPANY, Inc.,
Dept. 614, 402 Kentucky Avenue
Indianapolis 7, Ind.

Offices and Distributors in All Principal Cities
Write for New Catalog 757.



Diamond Sprockets are stocked in all standard types including finished bore and taper-lock sprockets for maximum availability through your Diamond Distributor.



Diamond all-steel Flexible Couplings and Casings for end-to-end shaft connections absorb moderate shaft end play and misalignment. They are easily connected and disconnected.

THE TRADE MARK ◇ IS ON EVERY LINK

DIAMOND ROLLER CHAINS

For more facts circle 512 on Reply Card

BULLETINS just released and of immediate plant interest

On pages 245-246 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

PUMPS, COMPRESSORS

101 Air, Vacuum Pumps—Sixteen-pp Catalog 757 describes rotary positive air and vacuum pumps, gas boosters and air motors. Gives details of construction, dimensions, capacities, performance curves. Leiman Bros., Inc.

102 Sealless Pumps—Eight-pp Catalog 10.0 features technical data and material selection information on Flex-i-liner sealless plastic and stainless steel pumps. Performance data with pump characteristic curves and charts, capacities, operating pressure ranges. Vanton Pump & Equipment Corp.

103 Air Compression for Industry—This is a 24-pp combination data book and catalog on all types of air compressors from ⅓ hp to 20 hp. Discusses factors to be considered in the use of air for each operation, and points out importance of determining how much usable air is needed, not just the theoretical rating of the compressor. Engineering data charts are included. The Wayne Pump Co.

104 Rotary Air Compressor — Eight-pp Bulletin P-106B describes company's 600 rotary air compressor. Photos and close-up views illustrate design and construction features, and general specifications are included. Le Roi Div., Westinghouse Air Brake Co.

VALVES AND TRAPS

106 Diaphragm Valves—Bulletin 800 contains specifications and dimensions on company's diaphragm valves for pressure and vacuum service. Typical flow characteristics and water capacities are indicated. W. S. Rockwell Co.

107 Cushioned Valves—Bulletin G-5 describes and shows schematically various piping arrangements for particular applications, such as supply water to mill, accurate water level control in reservoirs, emergency fire protection, and isolating system. Golden-Anderson Valve Specialty Co.

108 Eccentric Plug Valves — Catalog 54 describes advantages and design features of easy-operating plug valves which combine an eccentric-shaped plug and an eccentric raised-seat in the valve body. Dimensional data and selection information are given, as well as photos and diagrams of valve features and curves to show frictional resistance to flow of water in terms of pressure drop. DeZurik Corp.

109 Valve Lubrication—This 19-by-24 in. chart contains maintenance and lubrication information for company's lubricated plug valves. Of heavy paper with metal edges, the chart features detailed exploded views of four types of valves and includes a table of recommended lubricants for oil, water, gas and chemical service. Meter and Valve Div., Rockwell Mfg. Co.

110 Steam Trap—Six-pp Bulletin AD-2261 explains how an inverted open float steam trap works to remove condensate and keep steam lines hot and dry. Includes tables and instructions for selecting traps for any condensate discharge condition. Also included are a diagram and recommendations for proper installation, as well as a table of dimensions. Crane Co.

ELECTRICAL

112 Vertical Motors—Bulletin 2050 presents "climatized" vertical hollow shaft motors for shallow and deep-well turbine application. Advantages of the weather-protected enclosure are stressed and other construction features noted. Also explained are installation and maintenance time-reducing features. The Louis Allis Co.

113 Power, Lighting Cable—Bulletin RR-10 describes Type RR cable, which combines the insulating qualities of suitable insulating compounds with the toughness and flexibility of Trioprene. Tabular data includes dimensions. Triangle Conduit & Cable Co., Inc.

114 Power Circuit Breakers—Bulletin GEA-6599, 8 pp, covers 69-kv power circuit breakers rated 1000, 1500 and 2500 mva, 600-1200 amp, and Bulletin GEA-6600, 8 pp, describes those rated 3500 and 5000 mva, 2000 amp. Each bulletin describes oil-blast interrupters that provide five-cycle interruption with low oil carbonization and reduced contact erosion. Includes curves, test and mechanism data, dimensions for floor or frame mounted designs. General Electric Co.

115 How to Use Capacitors — Twelve-pp Bulletin GEA-5632B, describes the why, where and how of industrial capacitor applications. Presents units and equipments available; discusses problems and solutions in selection of industrial capacitors and includes diagrams and pictures. A brief explanation of how capacitors lower power costs, release system capacity, and improve voltage levels is included. General Electric Co.

116 Better Brush Performance—Eight-pp Bulletin GEA-6688 tells how to get the best performance out of carbon brushes. Question-and-answer treatment covers brush life, metal transfer, commutator threading, bar marking, handling of copper drag, and commutator adjustment. Photos accompany text. General Electric Co.

117 Precision Switches—Advantages of precision switches for automatic operation of plant equipment are detailed in illustrated. Form 84-272. Applications in process control, bulk flow controls, packaging controls, motion control, counting and weighing, and level control are illustrated. Micro Switch, Div., Minneapolis-Honeywell Regulator Co.

MECHANICAL POWER TRANSMISSION

119 Adjustable Speed Drive Selector—Catalog GEN-169 is a slide-rule-type plastic device designed to assist in selecting proper motor, control panel, and operator's station of a general-purpose Thymotorol adjustable speed drive. Covers both fractional and integral drives up to 3 hp. By setting slide at desired horsepower, appropriate ratings, frame sizes, dimensions, and model numbers can be rapidly determined. General Electric Co.

120 On Flexible Shafts—Basic data on flexible shafts for remote control, power drive and coupling applications are given in 14-pp Bulletin 5601. Covers flexible shaft functions, advantages, nomenclature and characteristics. Selection factors are listed and discussed. A table shows torque transmitted at different horsepowers and speeds. Other sections of bulletin give details on connecting flexible shafts, methods of attaching end fittings, use of integral formed drive squares and "do's and don'ts." S. S. White Industrial Division.

121 Power-Safe Brakes—The illustrated story of company's newest electric brake designed for fail-safe applications is told in this 36-pp technical report. Catalog features detailed descriptions of component parts and includes photos, drawings, diagrams, as well as an illustrated explanation of operation, selection factors, torque characteristics and controls. Warner Electric Brake & Clutch Co.

122 Bearings and Rod Ends—Features and engineering data on company's lines of spherical bearings and rod ends are presented in 10-pp Catalog 257. Applications now in use and those under consideration by design engineers are detailed, and photos and dimensions included. Sealmaster Bearing Div., Stephens-Adamson Mfg. Co.

123 Precision Bearings—Advantages and range of types and sizes of miniature ball bearings are detailed in this illustrated 24-pp bulletin. Dimensions in inches are given, as well as actual size photos of the bearings, and features are fully illustrated and described. Applications, load ratings, limiting speeds and mounting procedure covered. Miniature Precision Bearings, Inc.

125 Geared Flexible Couplings—Book 2775, 12-pp, details pertinent application and selection data for couplings with maximum bores ranging up to seven inches and ratings from 2½ to 572 hp per 100 rpm. Describes four basic applications and includes cutaway views and drawings illustrating features of couplings. Link-Belt Co.

BULLETINS

(Begins on page 21)

126 Flexible Cushion Coupling—Bulletin A669, 12-pp, describes the Paraflex, a flexible cushion coupling with a flexing body that automatically compensates for all combinations of misalignment and end float. Full veiw and cutaway photos are included along with drawings to illustrate construction and installation features, and engineering data. Dodge Mfg. Corp.

INSTRUMENTS, CONTROLS

127 Flow Tube—An impact-type head meter (differential producer) designed for accurate measurement and regulation of fluid flow is described in 6-pp Bulletin FT. Advantages are listed, and typical installation photos, cross section drawings and performance data are included. Foster Engineering Co.

128 Thermostat Accessories — Modern accessories for electric themostats and limit controls are described in Bulletin RT-819. Contains detailed drawings and diagrams of available thermostat cases, devices for adjusting temperature controls, mounting brackets and stuffing boxes. Robertshaw-Fulton Controls Co.

129 Boiler Safety Controls—Bulletin L-711, 24pp, covers basic safety controls for low pressure steam boilers. Simple diagrams and explanations tell the "why" and "how" of all authoritative methods of providing maximum safety and automatic water level control for all low pressure steam boilers. McDonnell & Miller, Inc.

CONSTRUCTION

130 Steel Framing—Catalog 57-V is a 40-pp reference manual of steel framing design details. Includes photos, drawings and dimensional data on a structural framing system employing a rigid connection without bolts, rivets or welding. Illustrates solutions to a wide range of steel framing problems. Macomber Inc.

131 Shortspan Joists—Bulletin 3004, 32-pp, describes shortspan open-web steel joists which offer a safe, economical, and lightweight system of floor and roof construction. Fully explains advantages in text and diagrams, and provides tables of available dimensions, properties and allowable loading, complete specifications, and recommendations for handling and erecting. Ceco Steel Products Corp.

132 Fir Plywood—This 12-pp, two-part catalog (Form S-57) covers fir plywood grades, specialty products and application data in condensed tabular form. Includes structural drawings that describe recommended uses for floor construction, wall sheathing, roof sheathing and various soffit applications. Covers type-use recommendations, standard stock sizes of both interior and exterior types, recommendations on plywood siding and paneling. Douglas Fir Plywood Association.

133 Faced Steel Plate—Advantages of rubber faced steel plate are detailed in 24-pp Catalog MRG-444. Illustrates and explains how abrasion problems in industries handling sand, gravel and concrete were solved by means of rubber faced steel plate, and describes other applications in metalworking, mining, coal handling, grain, seed and soybean, chemical and material handling. The Gates Rubber Co.

134 Luminous Ceilings — This 8-pp bulletin illustrates and describes seven types of luminous ceilings with specially designed track systems that install with minimum labor. Mounting diagrams are included, as well as photos of typical installations, table of coefficients of utilization and formulas, and specifications. Luminous Ceilings Inc.

VENTILATING AND AIR CONDITIONING

136 Air Conditioning Distribution—This booklet illustrates and describes the combined application of Electrionic temperature controls and Uni-Flo air distributor products. Typical installations are shown. Barber-Colman Co.

137 Centrifugal Ventilator—Twelve-pp Bulletin SDA-220 contains features, construction details, ratings, performance data and dimensions on both belt drive and direct drive roof ventilators. Recommended specifications are discussed, and numerous photos, line drawings, tables, charts and graphs included. The Peerless Electric Co.

138 Roof Ventilators—Powered and gravity roof ventilators and accessory products are featured in 8-pp Bulletin D10-58. Capacity and performance data are included, as well as photos and drawings illustrating features. Penn Ventilator Co., Inc.

139 Air Filters—Detailed information on filters designed to provide particle-free air for all critical air-cleaning problems is featured in this illustrated bulletin. A filter selection chart is included, as well as data on installation, and construction. Flanders Filters Inc.

140 Dust, Fume Eliminators—Catalog VRU-4-57, 8 pp, describes Centri-Merge vertical rotor type dust and fume eliminators, telling how they operate, and giving advantages and maintenance features. Capacities and dimensions are shown for both manual cleanout and conveyor cleanout designs. Schmieg Industries Inc.

141 Dust Colector—This 4-pp technical article covers a two-stage, cyclone-and-precipitator dust collection system. Includes photos of installation and explains how each unit operates. Buell Engineering Co., Inc.

METAL WORKING AND METAL FINISHING

143 Lathe PM Chart—This preventive maintenance chart covers cleanliness, lubrication, and inspection and adjustments for ram type and saddle type turret lathes. Under each heading is a column for item on machine requiring attention; one describing servicing required; and one giving frequency of service. Correct grade oil and grease to be used in lubrication of various units of the lathes are given. The Gisholt Machine Co.

144 Bending Machines—Catalog 356, 24pp, describes applications of bending machines and includes photos illustrating bending tubing, pipe, extrusions and rolled sections. Discussion of bending practices is included, as well as specifications for all standard models, and photos of typical installations. Pines Engineering Co., Inc.

145 Tracer Control—Form 1171-AGR is a 12-pp catalog on tracer controlled manual and automatic lathes. A simple schematic drawing explains operation principle, and various models for use with ram and saddle type turret lathes, automatic turret lathes, and single spindle automatic lathes are described. Gisholt Machine Co.

Reader Service Cards for ordering bulletins are on pages 245-246. Be sure to include your name, job title, and company, even if you want bulletins mailed to your home address.

146 Barrel Processing—Advantages and typical installations of automatic barrel processing for zinc, nickel, copper, tin and cadmium plating, cleaning, washing, phosphating, stripping and other similar immersion applications are featured in 14-pp Catalog 60A. 189 scale photos of parts that have been plated or processed in the automatic barrel machines are included. Frederic B. Stevens, Inc.

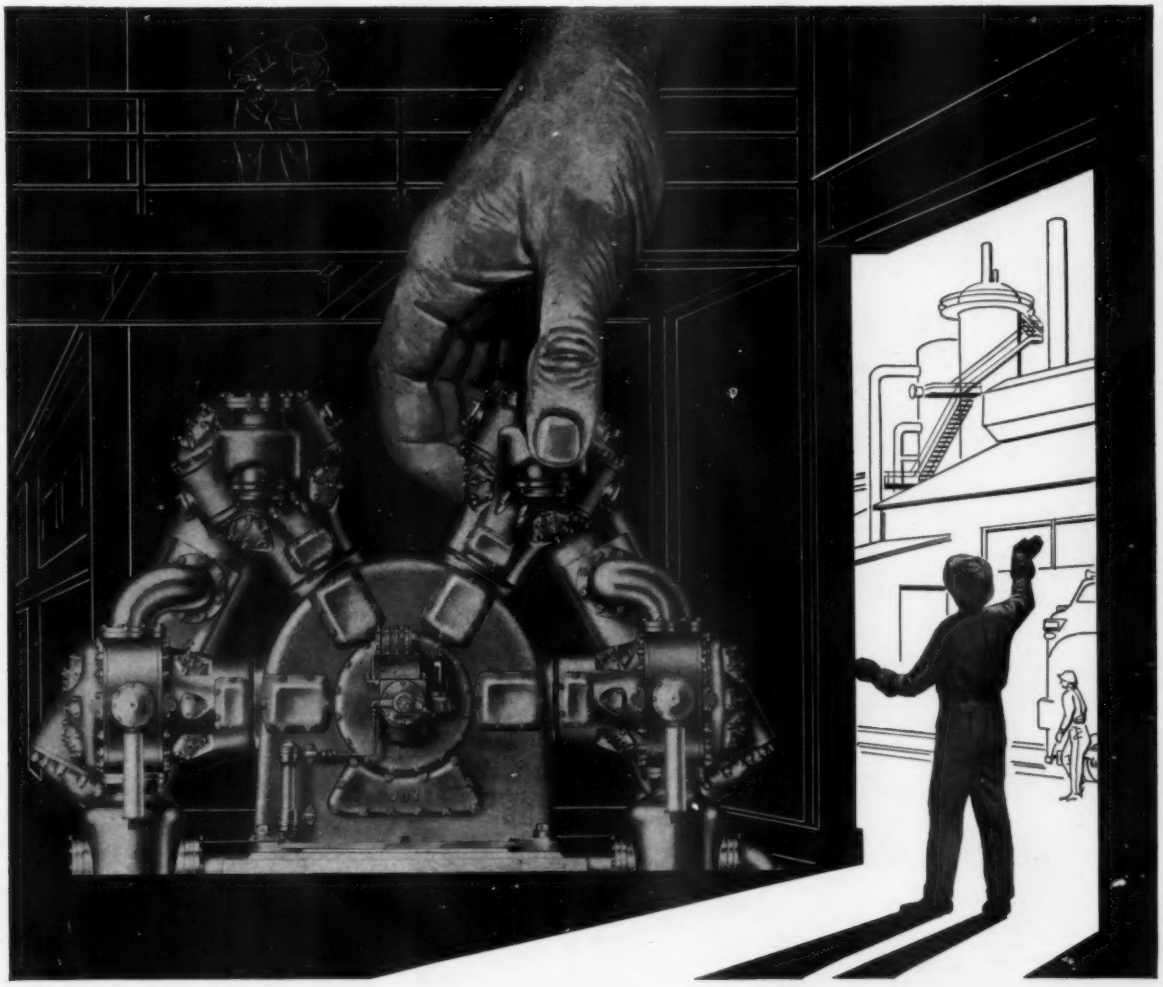
147 For Blast Cleaning Machines—Bulletin 100C, 28 pp, covers selection and application of hand-operated blast cleaning hose machines used for maintenance cleaning, ornamental etching and carving, marine scale removal, foundry operations and exterior cleaning. Describes methods of applying abrasives from nozzle blast cleaning units, as well as applications of wet and soft abrasives. Pangborn Corp.

148 Special Cleaning Problems—Photos and schematic drawings are used in 34-pp Catalog 105-D to show how airless blast cleaning, air blast cleaning and wet blast cleaning has been employed in specific applications. Short case histories relate the experiences of more than 50 companies in solving special cleaning problems. Wheelabrator Corp.

METALS

149 Stainless Steels—Properties and applications of 17-4 PH and 17-7 PH stainless steels are featured in 28-pp Catalog 4757. Fabricating procedures for these special precipitation-hardening alloys are also covered. Examples of improved product design and performance and reduced costs are detailed. Armco Steel Corp.

(More Bulletins on page 247)



SET A 500 TO 1000 HP AIR COMPRESSOR IN THE CORNER OF YOUR PLANT . . . *almost as easy as this*

IF YOUR EXPANDING PLANT FACILITIES are requiring more compressed air . . . *and* putting a squeeze on plant space, here's the answer . . . the *new* Joy WN-224 compressor. Because of its compact semi-radial design, the WN-224 is delivered as a package—completely assembled—ready to go. Just bolt it down, connect power, water, and air lines . . . and you're ready for long, continuous service. This is the only true "package" compressor available in these capacities . . . 2418 to 6048 cfm . . . horsepower ratings from 350 to 1000.

AND THE WN-224 SOLVES YOUR SPACE PROBLEMS . . . it can be installed where no other compressor of equal capacity will fit. Instead of long, horizontal units on massive foundations, the Joy WN-224 has four cylinders arranged semi-radially around the frame. This compact, balanced arrangement assures smoother running, gives longer service with far less maintenance. Get the whole story on the WN-224 from ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

WSW 1 6660-179

Write for FREE Bulletin 179-15

JOY . . . EQUIPMENT FOR INDUSTRIAL PLANTS . . . FOR ALL INDUSTRY

Industrial Compressors

Conveyors

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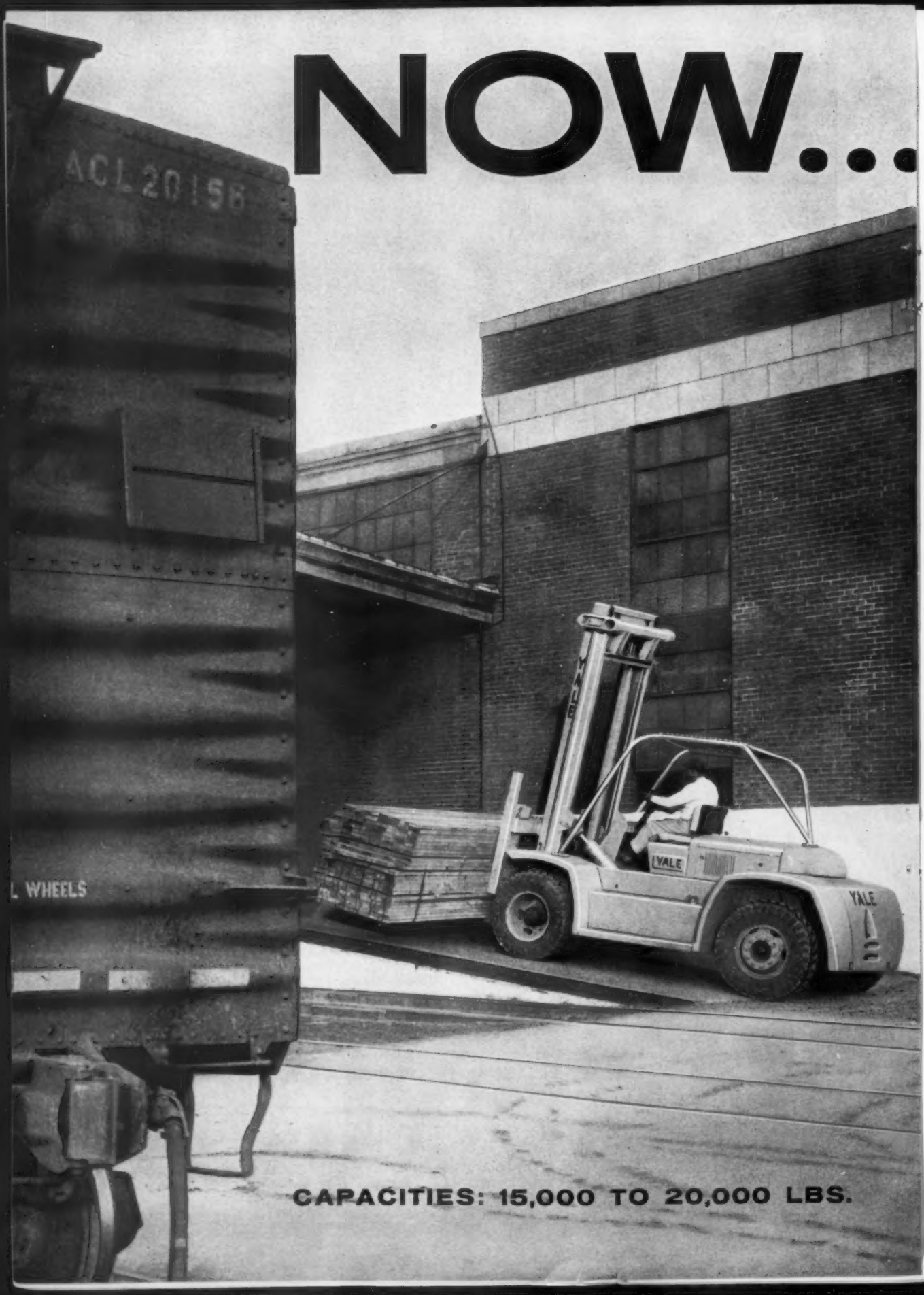
NOW...



CAPACITIES: 15,000 TO 20,000 LBS.

YALE G-3 GAS TRUCKS

with fully automatic transmission

GIVE INSTANT POWER

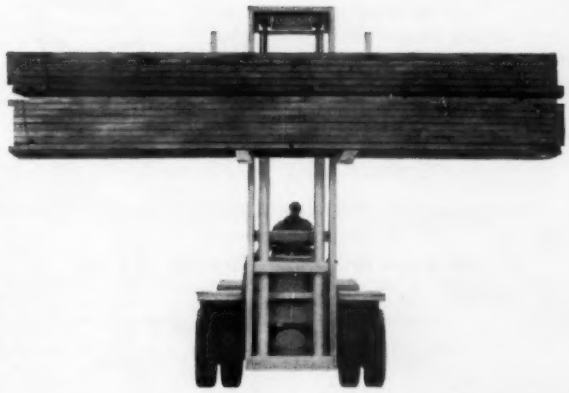
for smooth, fast-cycle handling of loads up to 20,000 lbs. under all operating conditions

AUTOMATIC POWER CONTROL. These Yale trucks supply power the instant it's needed... for fast starts or climbing grades... for accurate inching while capacity loads are lifted at speeds up to 60 feet a minute. Loads are spotted fast!

FAST-CYCLE OPERATION. Power steering, power brakes, separate inching control, small turning radius plus automatic transmission make maneuvering easier than ever. No more clutching or shifting of gears – the driver moves his truck in and out of tight areas fast! Travel speeds up to 20 miles per hour. Result: More trips per hour – more volume per day – a less tired operator.

GREATER STABILITY. No sudden shocks or jerks – automatic transmission delivers right amount of power for smooth starts and travel. Lowering is fast and controlled. Low center of gravity, broad lifting base, side-thrust rollers keep loads steady at all points of lift. H-beam side members in frame for extra strength. Anti-cavitation valve in tilt cylinders adds to channel stability. Large, high-flotation pneumatic tires give good traction for smooth ride up ramps and over rough terrain.

Yale G-3 Series High-Capacity Gas and LP-Gas Trucks are also available with Fluid Coupling or standard transmission. All models are designed for attachments – engineered for minimum loss distance.



EXCLUSIVE YALE "WIDE-ANGLE VISION"

The Yale G-3 Series Gas Truck gives the operator 300% more visibility than any other truck of its type! Channels are wide-spaced, nested to reduce frontal obstruction. Hoisting cylinders next to channels, out of line of sight. Wide channel spacing and open carriage design give maximum straight-ahead visibility *plus* the widest possible arc of vision at all levels of fork lift. Forward and to the rear, the driver has full visibility to speed big-load handling with complete safety.

YALE*

*REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

The Yale & Towne Mfg. Co., Yale Materials Handling Division
Manufacturing Plants: Philadelphia, Pa.; San Leandro, Calif.

Gasoline, Electric, Diesel & LP-Gas Industrial Lift Trucks
Worksavers • Warehousers • Hand Trucks • Hand & Electric Hoists

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Please send me brochure No. 5230A about the new Yale High-Capacity Gas Trucks.

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In Canada: write The Yale & Towne Manufacturing Co., St. Catharines, Ontario, Canada.

For more facts circle 514 on Reply Card

FOR VOLTAGES UP TO 600...

There's a *Safe and Dependable* BUSS Fuse or FUSETRON Fuse to fit the needs of every user

If you want Plug Fuses . . .

Use BUSS Clear Window Plug Fuses

Their one-piece body and "safety" design guarantees protection.

They are most convenient to use too, because real big windows and white backgrounds permits entire fuse strip to be seen. Even in poor light a blown BUSS fuse is easy to find.

If you want to make safe protection REMAIN SAFE as well as REDUCE blowing fuses . . .

Use BUSS Fustats (have Type S base)

FUSTATS like Fusetron Fuses have a dual-element and therefore, stop needless blowing — and they do more.

They have a type S base that prevents anyone from replacing them with a penny or substitute — or using a size too large to protect.

FUSTATS fit standard plug fuse holders by means of an inexpensive adapter that locks in place and needs never to be replaced.

If you want to reduce blowing of Plug Fuses . . .

Use FUSETRON dual-element Plug Fuses

FUSETRON Plug fuses protect like ordinary fuses against short-circuits and overloads — but unlike ordinary fuses they won't blow on motor starting currents or other harmless overloads.

They are the type of fuses recommended in the 1953 National Electrical Code.

To protect motors and apparatus of voltages up to 125 against burnout . . .

Use 0 to 14 amperes BUSS Fustats

A FUSTAT of the proper size installed to handle only the motor current will reduce to a minimum the chance of a motor burnout from an excessive over-current. In like manner it will protect solenoids, coils and transformers against burnout.

FUSTATS have the same degree of Underwriters' approval for both motor-running and short-circuit protection as the most expensive devices made. They give all the protection it is possible to obtain with any device on the market.

FUSES! . . . THE SAFEST AND MOST DEPENDABLE PROTECTION YET DEVISED!

A fuse has just one vital part — a thin narrow strip of fuse metal. When the heat of a short-circuit is applied, the fuse link must melt and open the circuit.

The high speed operation of the fuse reduces to a minimum the danger of short-circuit damage to wiring and equipment.

Fuses offer dependable protection over the years.

The fuse link is sealed in. Dust can't get at it. Corrosion or oxidation can't increase its capacity or lengthen its blowing time.

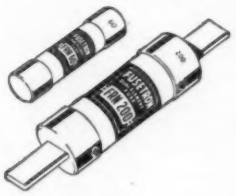
There are no hinges, pivots or contacts to stick or get out of order.

Millions of fuses have been in operation 30 years or more, because there has been no trouble on the

Play Safe! Install BUSS Fuses or

If you want fuses that — abolish all needless blows, stop overheating in panels and switches, protect motors against burnouts . . .

Use FUSETRON dual-element Fuses



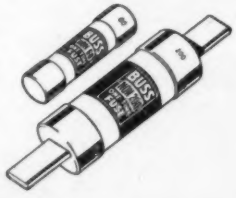
With rare exceptions, ordinary fuses or circuit breakers do not protect except against short-circuit but FUSETRON fuses provide TEN POINT protection.

1. Protect against short-circuits.
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels.
10. Protect coils, transformers and solenoids against burnout.

FUSETRON duel-element FUSES save you time and money because they are made to PROTECT — not to blow.

If you want Non-Renewable Fuses . . .

Use BUSS One-Time Fuses

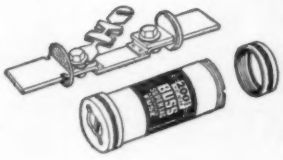


They save you time and trouble because they get the same engineering care in manufacture as do all products carrying the BUSS Trademark.

Every BUSS One-Time fuse can be depended upon to operate as intended under all service conditions.

If you want Renewable Fuses . . .

Use BUSS Super-Lag Renewable Fuses



The big advantage of these fuses over all other renewable fuses comes from the prevention of useless interruptions of service caused by needless blows.

The reason for this performance is found in the design of the fuse-case which assures good contact on the fuse link, even if the fuse is renewed by an inexperienced person — and by the time-lag built into the link that prevents the fuse from opening on motor starting currents or other harmless overloads.

If you want SAFE protection on loads above 600 and up to 5000 amps . . .

Use BUSS Hi-Cap Fuses

On voltages up to 600, high speed operation on heavy shorts limits current to safe values. This minimizes damage to equipment and cuts down dangerous stresses on transformers.

For Short-Circuit Protection or when fast opening is desired . . .

Use BUSS Limitron Fuses

The extremely fast opening characteristics of these fuses prevent heavy short-circuit currents from building up under fault conditions.

For protection of TV, Radio, Instruments, Radar, Avionics and Electronic Equipment . . .

Use BUSS and FUSETRON Small Dimension Fuses

A complete line is available. Made in Dual-element (slow-blowing), Renewable and One-Time types in sizes from 1/500 ampere up.

And there is a companion line of BUSS Fuse Clips, Fuse Blocks and Fuse Holders to take them.

circuits they are protecting and therefore no occasion to open.

Yet, after years of inactivity, you can be sure the fuse will give the same safe, dependable protection if called upon to open as it would have on the day it was installed.

NO RECALIBRATION COSTS

When Fusetron fuses do blow, there is no recalibration needed. As quickly as the fault in the circuit is corrected, you slip in a new fuse that has been CALIBRATED AT THE FACTORY BY ENGINEERS — a fuse that is as safe and dependable as the one that blew.

FOR MORE INFORMATION ON BUSS AND FUSETRON FUSES WRITE TO BUSSMANN MFG. DIVISION McGRAW-EDISON CO. ST. LOUIS 7, MO.

FUSETRON

TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION

BUSS

1157

Fusetron Fuses Now! ***THROUGHOUT THE ENTIRE ELECTRICAL SYSTEM***

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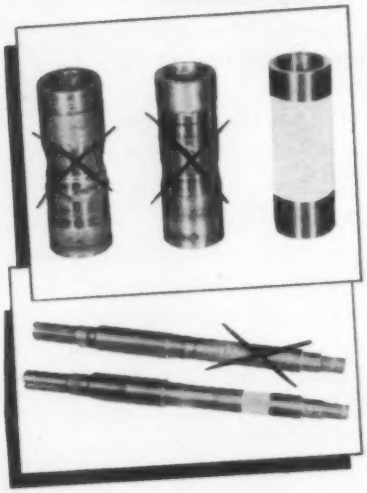
Eliminate
"CHEWED UP"
SHAFTS
with CHEMPRO
NEW SPRAYED
CERAMIC
SERVICE



Chempro's new extremely hard, chemically inert ceramic coatings applied to shafts and shaft sleeves eliminate the costly failure of "chewed up" or "scored" shafts and sleeves. Sprayed ceramic surfaces are highly resistant to abrasion, erosion and fretting corrosion under even the most difficult slurry service. They also give ideal protection against shaft wear under high packing gland pressures.

Pump down-time due to shaft or sleeve failure has been drastically reduced in every installation in which Chempro's sprayed ceramic surfacing has been used.

Write for new Chempro Bulletin CPZ8 for ordering information.

CHEMICAL & POWER PRODUCTS, Inc.
7 Broadway, New York 4, N. Y.

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BACKTALK AND FORETHOUGHTS

Edited by Marjorie E. Weissman

Maintenance Program Inquiry

PLANT ENGINEERING:

"Your magazine has published quite a few articles on preventive maintenance. I am preparing for an extensive program in all three of our plants.

"You would be most helpful if you would forward all reprints pertaining to this subject." *David L. Canham, Maintenance Engineer, Harrison Radiator Div., General Motors Corp., Lockport, N. Y.*

► Articles on preventive maintenance and preventive maintenance programs, published in PLANT ENGINEERING, have been forwarded to Mr. Canham with the editors, compliments—*Editors.*

Voltage Thief

PLANT ENGINEERING:

"Would you please forward a tearsheet of the following articles which appeared in the August, 1957 issue of PLANT ENGINEERING: 'Stop the Voltage Thief' by W. R. Crites, starting on pages 92; and 'Air Control Valves' by H. L. Stewart and J. M. Moritz, starting on page 126." *Luceen M. Beardsley, Reader Service Dept., Collier Carbon and Chemical Corp., Santa Clara, Calif.*

► Copies of these and other articles from our recent issues are still available to our readers.—*Editors.*

"Best of its Kind"

PLANT ENGINEERING:

"I received PLANT ENGINEERING, and found it to be one of the very best of its kind published today.

"I personally want to thank you for sending me this fine magazine and I am sure it will be helpful in my study courses on factory management." *Roland Regenhold, Job Analyst, Allis-Chalmers Mfg. Co., Springfield, Ill.*

Page-Turning Problem

PLANT ENGINEERING:

"I receive monthly PLANT ENGINEERING and find it most informative. However, and this applies to the majority of other similar publications, I am often discouraged from reading an article completely by the fact that the article (and it may be an important one in the magazine) will start on page 92 and then, just about the time interest has been aroused in the subject matter, I am instructed to turn to page 217. There I may read one column between some advertisements and then have to skip a page to read another column, or two or three short ones sandwiched in on a page with advertisements.

"Of course, I realize there is a reason for this and that it is a very old practice, but I still feel that it makes the reading more difficult and less pleasurable and I think a valuable article is often half-killed by being shunted around the book, thus frequently breaking the continuity of the reader's thought and attention.

"New around here, aren't you?"

"I have been reading many business magazines for a great many years and I am positive of the effect this practice has had on me and I know that others to whom I have spoken about it have felt somewhat the same way. I often think it would be better to make the article shorter, even cutting it to two pages and giving the meat of it in condensed form where it may get more attention than a much longer, drawn out affair distributed over sometimes as many as 10 or 15 pages from the front to the back of the publication.

"As I say, this is certainly not a complaint directed at PLANT ENGINEERING only; in fact, looking at your August issue I find that the practice I mention is used in only a few cases and there are many good articles which apparently have been condensed to one and two pages.

"I think your practice of showing the contents of PLANT ENGINEERING on the outside front cover is excellent and greatly facilitates the selection of

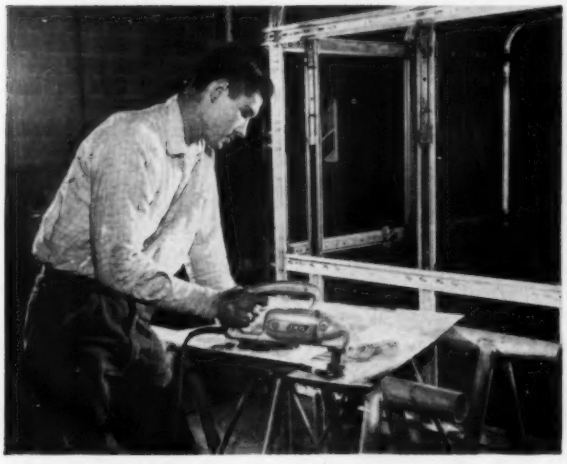
Saves $100 per unit

Griffin Tank and Welding Service of Dallas, Texas, custom builds geographic photographic equipment. This equipment must be lightproof, weatherproof, dustproof and air tight. "When SKIL drivers were substituted for hand tools for fastening, we saved over $100.00 per unit, and quality improved tremendously," says C. B. Jones, Chief Engineer.

Saves one operator

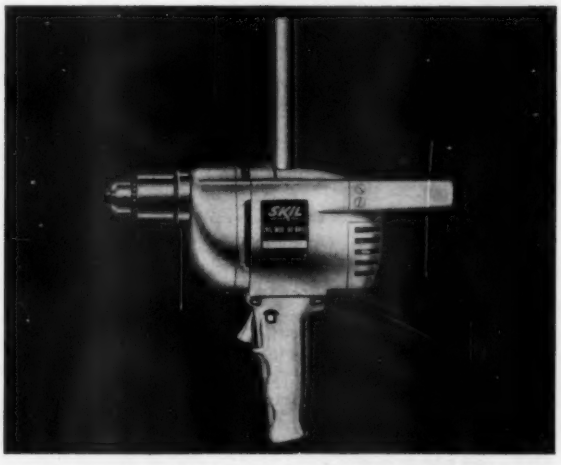
At Mercury Engineering Company, Milwaukee, Wisconsin, two men formerly handled the job above—drilling a 1⅛" hole in 16" steel. Then a SKIL Model 163 was tried. Now, one man not only drills, he also reams, taps and hones. "We always had good experience with all models of SKIL drills," says Ted Curtis of Mercury.

Metalworkers SAVE with SKIL tools



Saves $100 per week

"Our new SKIL Shear paid for itself in the first week," says J. M. McLain, owner of J. M. McLain & Sons Trailer Company, Houston, Texas. "In using other makes of shears we found that maintenance costs were about to run us out of business. Some operations were cut from 30 minutes to 1½ minutes. My men like SKIL shears because they are adaptable."



Save with New ½" Model 80 Drill

All-new design: shorter, narrower—one pound lighter! New power for fast drilling on the toughest jobs. No matter what you have to drill, cut, sand or grind, there's a SKIL tool to do the job faster, better, cheaper. Let your SKIL distributor show you why. Let him show you the speed, power, versatility and ease of handling of all SKIL power tools.

Write SKIL direct for free literature and the name of your nearest distributor.

Made only by SKIL Corporation, 5033 Elston Avenue, Chicago 30, Illinois. In Canada: 3601 Dundas Street West, Toronto 9, Ontario. Factory branches in all leading cities.

SKIL PORTABLE TOOLS

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...bend to the shape you need

Here is your quick, efficient and economical answer to hundreds of electrical heating problems. Clamp to metal surfaces, fit into machined grooves, cast into metals, immerse in liquids, install in ovens and ducts.

Versatile Chromalox Electric Tubular Heaters may be ordered in straight lengths or factory formed to nearly any shape required.

Select sheath metal and wattage to match your application and operating temperatures.

FREE — Send today for these 2 BIG HEATING HELPS

Catalog 50 — describes complete Chromalox line of "packaged" heaters, elements and controls.
Booklet F1550 — "101 Ways to apply Electric Heat."

C-2116-A

Edwin L. Wiegand Company
7553 Thomas Boulevard, Pittsburgh 8, Pa.

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BACKTALK— FORETHOUGHTS

articles of interest. It is certainly a tremendous improvement over having the page showing the contents of a magazine buried somewhere in the forward part of the book. I have often thrown aside otherwise valuable magazines because I had to thumb through as many as 20 or 30 pages to find some key to the articles." *C. M. O'Brien, P.A. and Supt., J. Schoenenman Inc., Baltimore, Md.*

▶ Just to put Mr. O'Brien on his mettle we have an unusually large amount of "runover" this month.—*Editors.*

Author's Request

PLANT ENGINEERING:

"Would it be possible for you to furnish six copies of my article 'ABC'c of Fuel Oil Heaters' published in the July, 1957 issue of PLANT ENGINEERING. Since this is my first published article I wish to thank you for thinking my efforts worthwhile." *R. J. Bosk, Liaison Engineer, The Griscom-Russell Co., Massillon, Ohio.*

Filing Systems and Such

PLANT ENGINEERING:

"We would be pleased to receive a reprint of your article 'Maintenance according to Schedule' from your May, 1956 issue as well as any further information you can supply on maintenance procedures and filing systems for same, especially as they apply to electric motors and controls." *A. D. Scharf, P. Eng., Staff Electrical Engineer, Potash Co. of America, Ltd., Saskatoon, Sask., Canada.*

▶ Mr. Scharf's request for tear sheets has been filled, but readers who have solved the filing system problem he mentions might like to pass along any helpful tips to him.—*Editors.*

Oops! Sorry, Department

PLANT ENGINEERING:

Attention: Cry on your shoulder Department

"We just received a copy of the 'Partial List of Manufacturers Selling Resin Dispersion Products'. Lo and behold, our fair name was not listed amongst them. What hurts us worse is that we have been manufacturing our K-183 Plastic Floor Polish for several years now and have distribution throughout the U.S. and Canada. Some of the names noted on your list are first-class competitors of ours.

"Please, Dear Editor, tell us, how can we get on your list?" *H. Goldenberg, Advertising Manager, Huntington Laboratories, Inc., Sanitation products, Huntington, Ind.*

▶ After such a gracious appeal, the Dear Editor could only hasten to add the name of our reader's company to the list and apologize for having made the omission in the first place. The list was mentioned in the article, "Which Floor Preservative Will Do?" which appeared in our September, 1957 issue. An amended list is now available.—*Editors.*

PIE and Rehabilitation

PLANT ENGINEERING:

"This institution is indeed grateful to you for sending PLANT ENGINEERING magazine. You may not be aware that the California Mens Colony is a State Correctional Institution.

"PLANT ENGINEERING is made available to inmates of the Maintenance Department following use by the Maintenance and Engineering office staff, and I must say it is very popular with them.

"Since 90 per cent of all inmates at this institution are subject to being returned to society following their incarceration, it is important that they keep their hand in their fields of endeavor. PLANT ENGINEERING is a means toward this end.

"Further, the writer will conduct a night class in our Adult Education Program on 'The Principles of Plant Operation' here this fall and would be interested in obtaining subject material which might be available through your company. We are especially interested in process manufacturing flow charts. If you do not have material of this nature available for such use, perhaps you might advise the writer as to where it may be obtained." *Sal Gran, Chief, Industrial Maintenance, California Mens Colony, San Luis Obispo.*

▶ We are interested to hear of this group of PLANT ENGINEERING readers and have suggested some sources of material which we hope will be helpful to Mr. Gran in his work.—*Editors.*

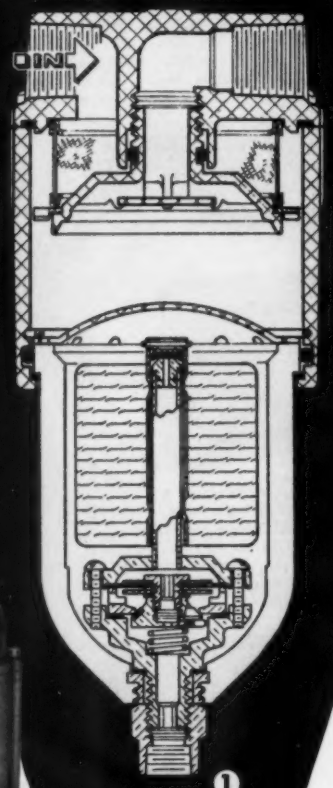
Machine Repair

PLANT ENGINEERING:

"We recently read your article on cold metal machine repair. Could you tell us if there is anyone in the Chicago area that either does this type of work or supplies the alloy bars used in the process?" *E. L. Cornell, Wm. H. Welsh Co., Inc., Chicago, Ill.*

▶ The names of companies which we think will be able to help Mr. Cornell have been forwarded to him.—*Editors.*

NEW Advanced design Norgren AUTOMATIC-DRAIN AIR LINE FILTERS



① MORE EFFICIENT WATER REMOVAL

② WIDER OPERATING RANGE 5 psi to 250 psi, up to 200° F.

NOW—24 Models to choose from

- Transparent Bowls—¼", ⅜", ½", ¾", 1"
- Metal Bowls—¼", ⅜", ½"

BETTER... MORE EFFICIENT FILTRATION OF COMPRESSED AIR

You Get These Important Advantages:

- **More Efficient Water Removal**
  Greatly increased water removal efficiency—even at air flows 143% higher than ever before.
- **Operates Over Wider Pressure Range**
  Top efficiency at as low as 5 psi for all models and as high as 250 psi for metal bowl type.
- **Operates Over Wider Temperature Range**
  New metal bowl models in ¼", ⅜" and ½" sizes extend temperature range to 200° F.
- **Withstand Rougher Usage**
  Metal bowl models are ideal for applications likely to get rough usage.
- **Simplified Drain Mechanism**
  More efficient operation. Fewer parts.
- **Eliminates Manual Draining**
  Collected liquid is drained automatically—cannot return to air line. Drain operates as long as pressure is on the system.
- **Choice of Three Filter Elements**
  74, 64 or 25 micron elements—interchangeable.

Wherever Air is Used in Industry

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For complete information, call your nearby Norgren representative listed in your telephone directory—

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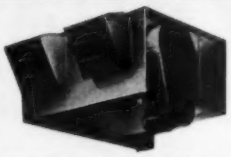
...another of the complete lines of Heating, Air Conditioning, Refrigeration and Heat Transfer products

FOR PLANT COMFORT AND EFFICIENCY

Look to *"one source—one responsibility"* . . . Dunham-Bush . . . for all your *heating* needs (as well as air conditioning, refrigeration and heat transfer products).
Yes, if it's for steam or hot water heating, Dunham-Bush supplies it! Not only unit heaters, but all the traps, vents, valves, pumps, etc. necessary for the complete heating system.
Ask for the name of your nearby Dunham-Bush sales engineer. His job is to assist you. You'll find it worthwhile, to listen to his "one source" story.

BLOWER TYPE



For heating and ventilating or heating only. 17 different sizes in 170 ratings from 125,000 to 1,500,000 BTU 1,430 to 20,800 CFM. Floor, wall, inverted wall, ceiling or platform mountings.

HORIZONTAL DISCHARGE Propeller Fan Type

For working pressures up to 150 psi, capacities from 15,600 to 360,000 BTU. Where steam pressures are in excess of 30 pounds, Model JM with less finned surface and lower final temperatures is recommended.

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Two models for working pressures up to 150 psi, capacities from 30,240 to 576,000 BTU. Four types of air diffusers available.

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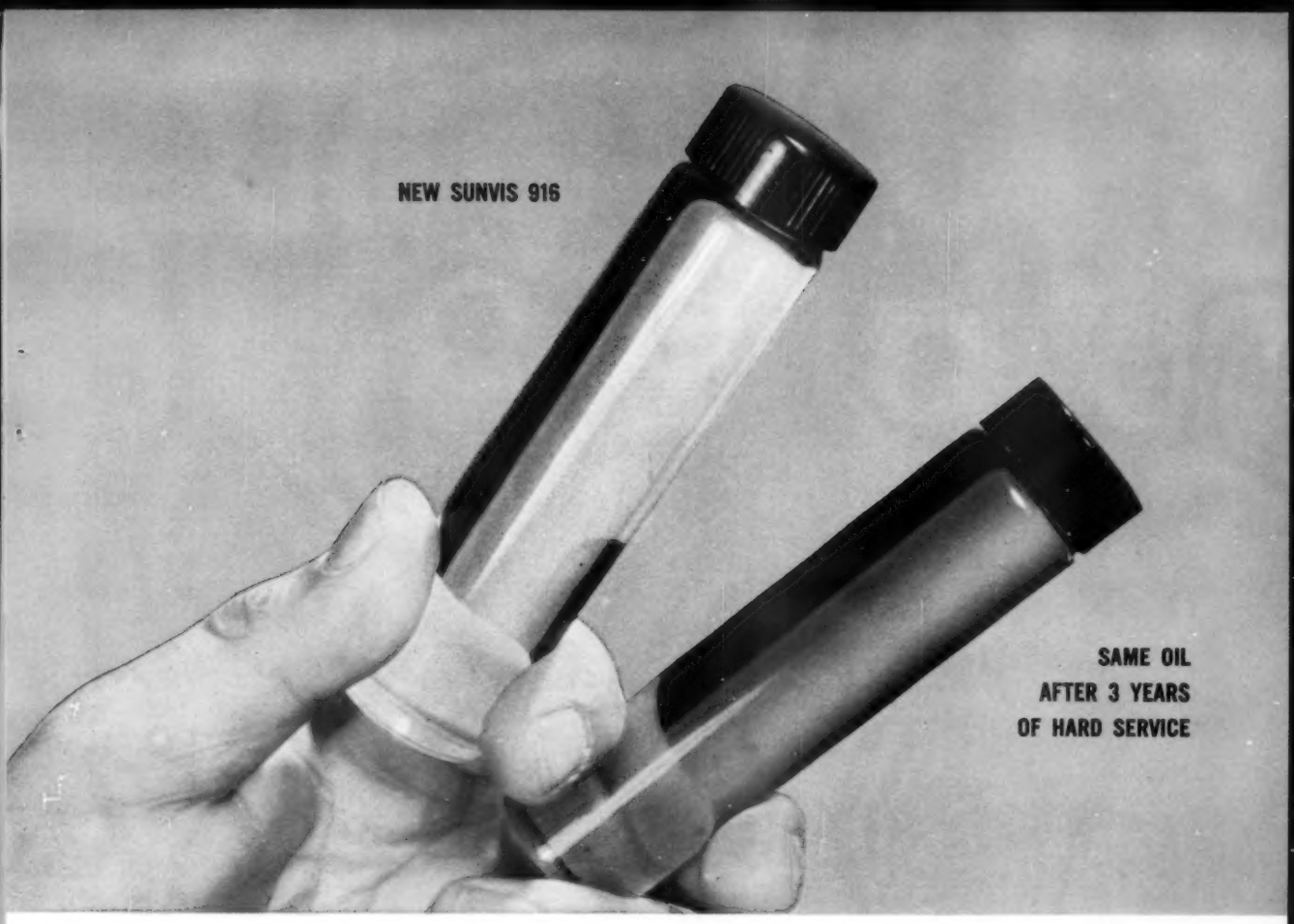

Comparative Tests Prove . . .

Sunvis 900 Oils have years of useful life under severe operating conditions

Versatile, long-lasting Sunvis® 900 oils are especially made to provide superior lubrication at high temperatures and in the presence of moisture. *They keep maintenance costs low.*

Time and again, when checked against new-oil specifications, used Sunvis 900 oils prove themselves fit for many more years of continued service, with *no* loss in performance features.

For example: The 3-year-old sample above was used in an injection molding machine operated for 40-48 hours per week at temperatures between 100 and 125 F. To see how the used oil compares with its original specifications look at the following table.

Specifications	New Sunvis 916	Sunvis 916 After 3 Yr*
API gravity at 60 F	30.5-32.5	30.3
Flash, open cup, deg F, min	400	400
Fire, deg F, min	460	460
Viscosity, SUS at 100 F	150-160	173.0
Viscosity index	90	90
Neut. number	0.10	0.05
Color, ASTM	1-1.5	3.5

*Typical Test

HOW TO GET MORE INFORMATION

Call your Sun representative, or write for Technical Bulletin No. 35, Sun Oil Company, Philadelphia 3, Pa., Dept. I-7.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

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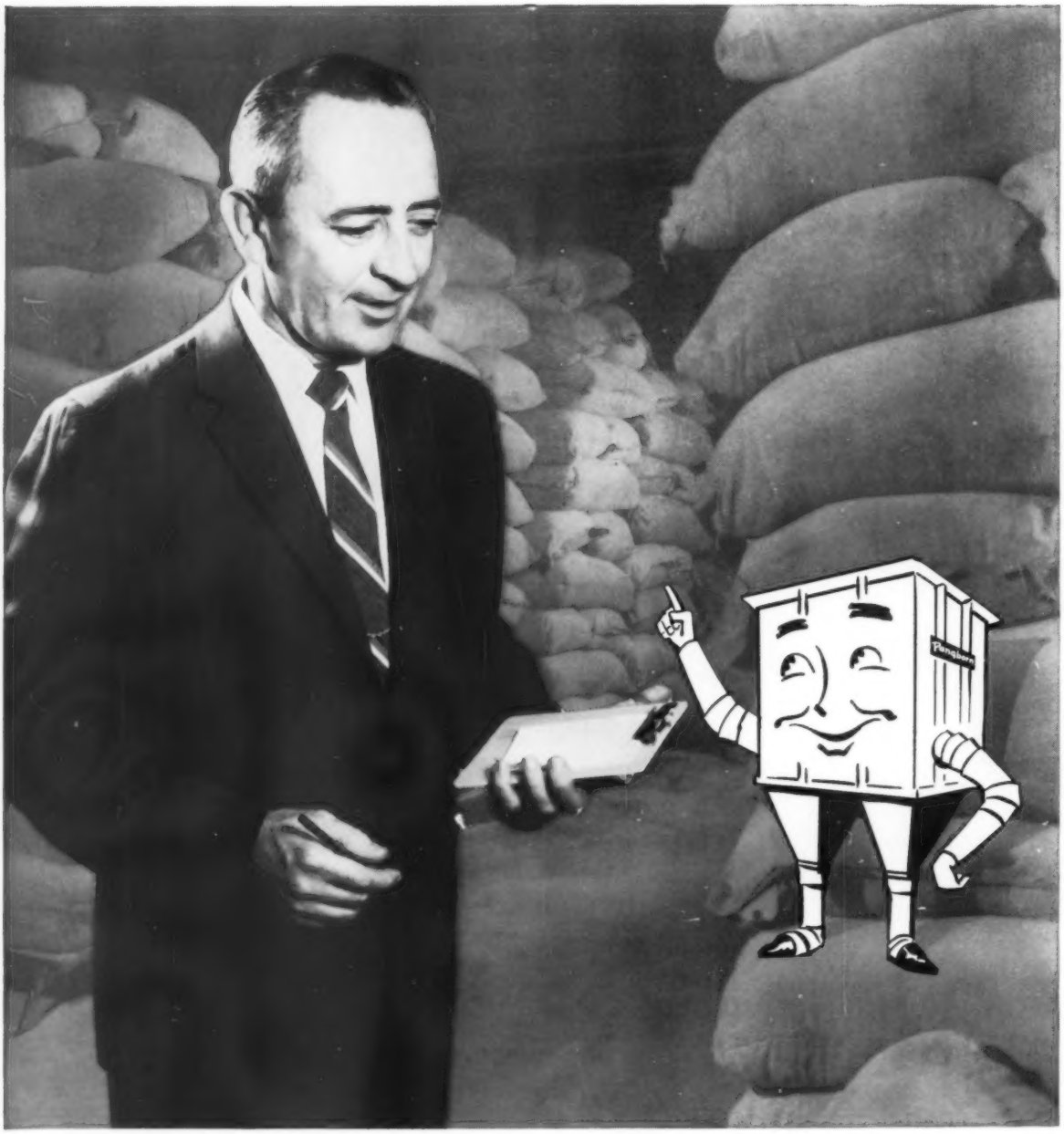

"You mean $15,000 a year salvaging dust?"

That's just what we mean! Many of our customers are clearing $15,000 a year and more from valuable material reclaimed by Pangborn Dust Control. Efficient Pangborn Dust Collectors trap dust at the source, gather it ready for resale, re-use or disposal. As a matter of fact, users of Pangborn Dust Control have made $20,000, $36,000, even $75,000 a year in salvaged dust, depending on the value of the dust collected.

What's more, Pangborn gives you other benefits of lower housekeeping costs, longer machinery life, higher employee efficiency and better employee and community relations. And Pangborn offers a complete line of collectors for all jobs.

Why not discover how you can profit from Pangborn Dust Control? Write for Bulletin 922 to PANGBORN CORP., 3200 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control & Blast Cleaning Equipment.*

Pangborn CONTROLS DUST

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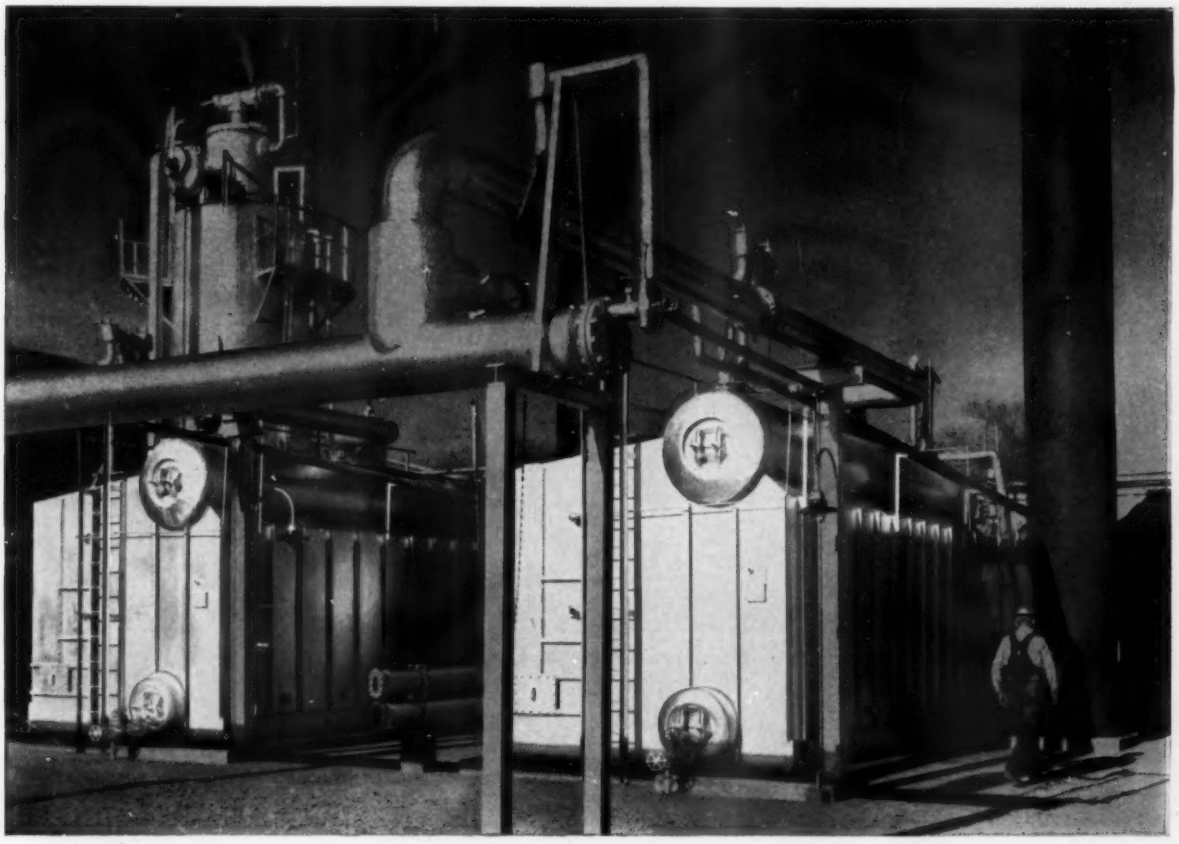

PACKAGED STEAM by FW

helps load more than 7,000,000 gallons of oil in less than 3 months

WHEN U. S. refiners recently were required to meet a sudden, extended demand from Europe for oil, one of the key points of supply was the Magpetco Terminal of Magnolia Petroleum Company. With storage capacity for some 4½ million bbl of petroleum products, this southeastern Texas tank farm was a "natural" for emergency use as a crude oil outlet point – 7,000,000 gallons of crude oil were loaded in less than 3 months.

The two Foster Wheeler Packaged Steam Generators shown above not only met all the normal load requirements but demonstrated ample reserve capacity for emergencies. They provided a reliable source of steam which was essential to operate the many large reciprocating pumps and to heat heavier oil in the storage tanks to facilitate pumping.

Chosen by Magnolia engineers to replace outmoded steam equipment at the terminal, the units are installed outdoors. Casings are of all steel welded construction with weatherproof insulation over the drum ends. Each unit delivers 30,000 lb of steam per hour at 150 psi. Dimensions are: 10′ x 28½′ x 12′ high.

FW Packaged Steam Generators are available in capacities from 10,000 to 62,500 lb/hr and pressures to 1300 psi. For complete information, send for Bulletin No. PG-55-3. *Foster Wheeler Corporation, 165 Broadway, New York 6, N.Y.*

FOSTER WHEELER

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PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by Marjorie E. Weissman

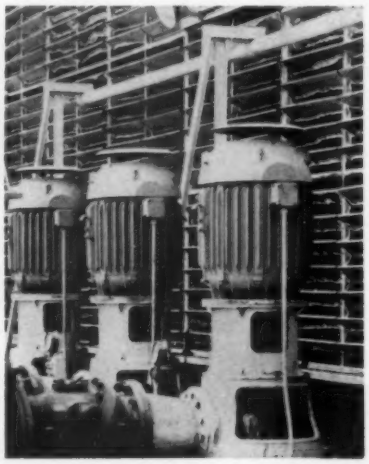
Choosing Cooling Tower Pump

NUMBER OF PUMPS required in a single cooling system may vary and include: 1. cooling tower pumps; 2. circulating water pumps; and 3. make-up water pumps.

Cooling tower pumps are considered as those having the sole function of pumping the cooling water, after the water has traveled through the system, from a given datum to the top or "hot side" of the cooling tower.

The head against which the pump is to operate is, therefore, principally static lift and generally involves little friction head. Only in towers where spray nozzles are employed or where pumps are located away from the tower is it generally necessary to consider friction head as an important factor.

Circulating water pumps are used on the "cold water" side of the tower and provide the capacity and pressure necessary to distribue cooling water through the system and to cooling tower pump. The pressure requirement is generally variable and is caused principally by friction through the system.



Circulating pumps sometimes perform function of cooling tower pumps

The circulating pump is often designed to perform, in addition to its own function, the duties of a cooling tower pump. This is especially worth considering when system pressure requirements are relatively low and the pressure required by the tower falls within design pressure limitations of the system.

Make-up water pumps generally handle raw water from rivers, lakes, wells, etc., to replenish the supply of cooling water lost in evaporation or leakage. Although usually small capacity pumps, they deserve the same consideration and study as their cooling tower and circulating companions.

Chemicals used in cooling water to control corrosion and scale, or in the cooling tower to control algae or delignification do not generally necessitate the pumps being made of special materials. Where raw water from wells, rivers and bays, etc., is used, the source should be analyzed to determine physical and chemical properties which might indicate the need for special pump and equipment materials.

The importance of proper analysis of the system against which the pumps are to operate cannot be overemphasized, especially where variable heads will be encountered, as with circulating pumps. Maximum, minimum and normal head should be plotted for varying capacities and submitted to the pump supplier so he can properly select a pump that will be compatible with the individual system.

(Continued on page 38)

Jet of Flame, 4000 F Hot, Drills Blast Holes for St. Lawrence Seaway

INTENSELY HOT JETS of flame traveling faster than the speed of sound are being used by Canadian contractors to sink blast holes in rock on the St. Lawrence Seaway project. The flame, which reaches a temperature of 4000 F, is spit out of a rocket type burner and disintegrates or spalls the rock in its path in a continuous operation.

Rig is fed combination of fuel oil and oxygen. At right, close-up view of flame

Disintegrated rock particles are thrown up out of the hole by the combined force of burning gases and steam so that a fresh surface is continually exposed to the jet flame. Only limitation to penetration depth is the length of the hoses carrying fuel, oxygen and water into the hole.

The flame is obtained by using 40 gal of low viscosity fuel oil or liquid hydrocarbon fuel such as kerosene, combined with 10,000 cu ft high-purity oxygen every hour. The modified churn drill rig used for the operation was developed in cooperation with Bucyrus-Erie Co. *From a release of Linde Company, Div. Union Carbide Corp., New York, New York.*

Now, more than ever, engineers specify: "CONDULETS*... or approved equal"

After 51 years of use in every conceivable application, Condulets remain the standard of quality for rigid conduit fittings.

It's not hard to see why. Pick up any Obround Condulet, for example, and note such features as these:

TAPER TAPPING: Condulet threads are taper tapped to match tapered conduit threading . . . giving you a rigid joint that will not loosen . . . insuring *permanent* ground continuity!

INTEGRAL BUSHING: A smooth, rounded, burr-less surface that protects wire insulation.

WEDGE NUT COVER FASTENER: This exclusive Crouse-Hinds feature is part of the cover itself. Screws can't fall out. No screw holes to locate. No protruding screw hole ears to damage cable.

LONGER HUBS: Conduit can be tightened completely without bottoming on integral bushing. And there's generous surface space for good wrench hold.

MATERIAL: Feraloy, a special alloy that is strong and tough, resists corrosion . . . gives sharp, full threads.

FINISH: A triple-layer treatment that exceeds Federal and U.L. specs for longer-lasting protection.

Where else can you find all (or even *most*) of these features? You *can* find them all in each of the 45 types of Obround Condulets . . . sizes ⅛" to 6".

There is a type for every need, including a wide selection of interchangeable covers and wiring devices. Just call your Crouse-Hinds distributor and ask for "Condulets!"

*CONDULET is a coined word registered in the U.S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

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PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Where space is limited, vertical turbine pumps for cooling tower and circulating water service, for capacities from 500 gpm and head from 40 ft upwards, often require from 60 to 65 per cent less floor space than horizontal pumps with the same rating. The support may be two beams across the sump. The vertical feature allows the designer to place pumping element at a level where submergence is automatically available, eliminating priming requirements, suction valves and fittings.

Vertical turbine pumps generally have head capacity characteristics which allow close operation to the design capacity for variable heads.

Staging impellers permits the possibility of obtaining increased pressure or capacity at a later date to meet system changes by installing larger diameter impellers or adding more stages, without the necessity of purchasing a complete new pump and/or changing mounting and discharge fittings.

Although the vertical turbine pump is extremely versatile in adapting conveniently to conditions as described above, basically it is a simple machine. Cost of maintenance is minimized. The pump and driver need only a vertical hoist to permit complete removal. Bearings and rotating elements are easily replaced since entire unit may be disassembled and repaired, often at the jobsite. Lubrication requirements during operation are limited to motor bearings only, since other bearings are lubricated by the liquid being pumped. *From Power and Fluids, published by Worthington Corp., Harrison, N. J.*

Color Conjures Safety

SPECIAL SAFETY-COLOR code for workers' shirts emphasizes use of such colors as orange, yellow, green and blue, each chosen to meet the needs of special crafts.

Based on research and traditional association, the system established colors and symbols to indicate accident hazards, identify protective equipment and assure orderly arrangement and good housekeeping. Structural steel workers, elevator operators and others wearing orange, indicate work of a high hazard factor. Men in semi-hazardous jobs

(Continued on page 40)

Four-foot Thick Concrete Sliding Door Provides Protection Against Radiation

RECONSTRUCTION of a concrete building for the x-ray testing of metal castings at the South Plant of the Scullin Steel Company included the design and construction of a 60-ton reinforced concrete, automatically-operated sliding door. Measuring four feet thick by 13 ft square, the door glides easily back and forth, closing off the x-ray room.

The building houses two x-ray machines, used to penetrate and examine metal castings for imperfections. The machines are mounted on overhead bridge cranes.

The electrically-operated door mechanism is located in the pit under the floor. As the door travels within a trench, a special platform mechanism had to be designed to cover the trench and permit the movement of steel castings into the building once the door is opened. This platform is automatically lowered as the door opens and can handle a 20-ton load.

To eliminate radiation hazards the door overlaps 1½ ft on each side of the wall opening. The 120,000 lb door is operated by a two-horsepower motor at reduced speed. Concrete radiation barrier walls are of considerable thickness varying between four and seven feet. *From ForCite, published by Fruin-Colnon Contracting Co., St. Louis, Mo.*

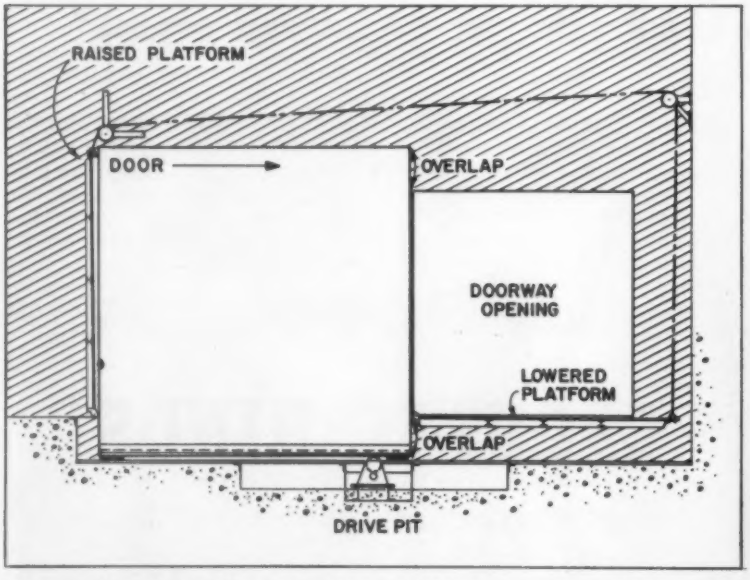
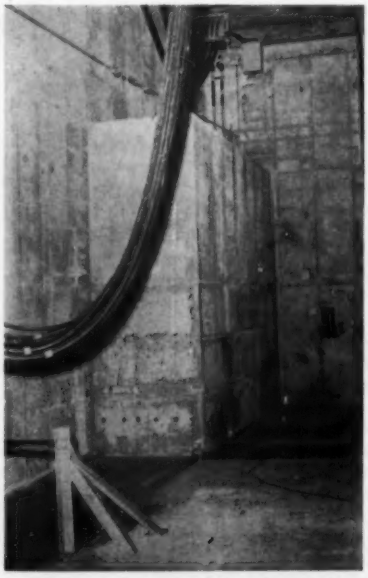


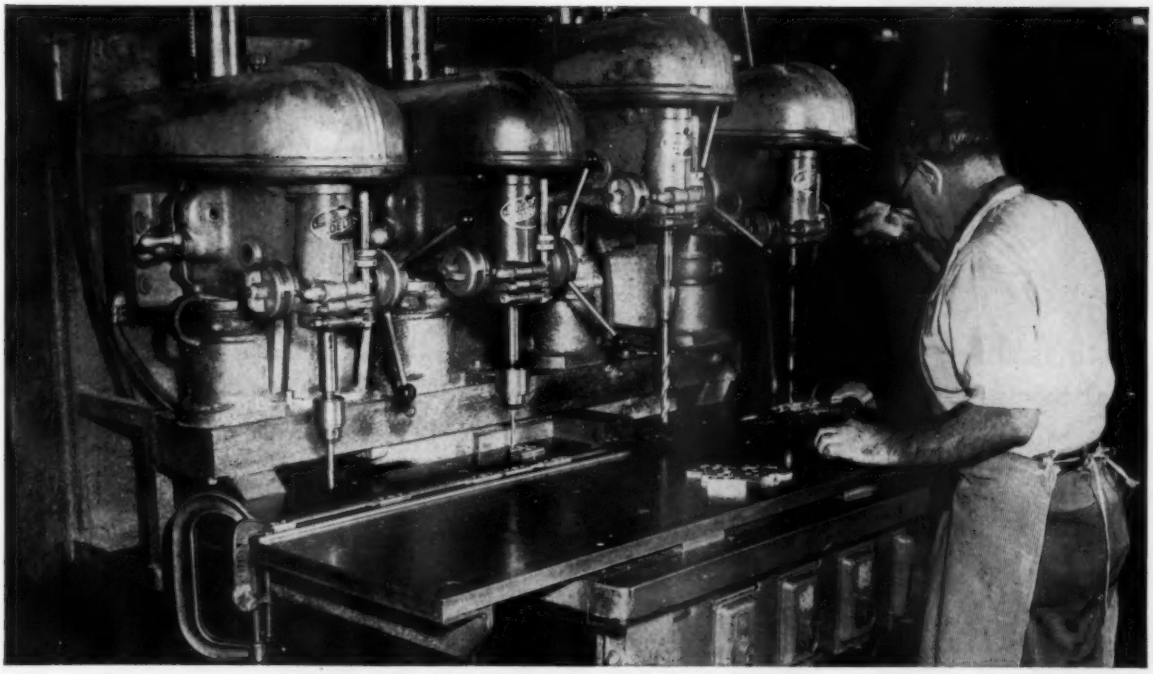
Diagram shows installation of 4-ft thick, 120,000-lb concrete door which overlaps 1½-ft on all sides of wall opening. It is operated by 2-hp motor at reduced speed



Door travels in trench. Platform allows movement of material in and out of room

ROCKWELL-BUILT

DELTA drill presses



. . . save cost of expensive machines

for General Bronze Corp., Garden City, N. Y.

FLEXIBILITY NEEDED—"Producing custom ornamental metal work for architectural use calls for limited production runs and fast product output," says Joe Gafney, Plant Engineer, "and Delta drill presses give us maximum flexibility to meet these constantly changing production demands."

PRECISION AT LESS COST—This Delta drill press set up drills, countersinks and counterbores over 500 bronze window blocks per day, with precision that eliminates costly rejects. And stock Delta power tools provide an inexpensive way to meet peak work loads and prevent bottlenecks.

LONG LIFE, LOW MAINTENANCE—"We have some Delta equipment that has been in regular use for over 15 years," says Mr. Gafney, "and still performs with almost no maintenance. Rugged construction and low-cost maintenance are Delta Quality features we really appreciate."

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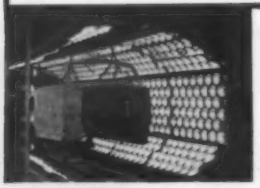
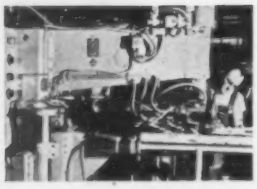
GENERAL ELECTRIC

VOLTAGE REGULATION PHOTO QUIZ



QUESTION:
In infrared drying ovens, what causes scorching or lengthens baking cycle while shortening lamp life?

ANSWER:
"Bad Voltage"—over or under lamp rating.



QUESTION:
In electronically controlled machines, what causes excessive rejects, down-time and high maintenance costs?

ANSWER:
"Bad Voltage"—over or under nameplate rating.

QUESTION:
What makes electroplating equipment produce poor plate quality, high rejects?

ANSWER:
"Bad Voltage"—over or under nameplate rating.

QUESTION:
What causes electronic computers to give wrong answers, requiring costly down-time and high maintenance?

ANSWER:
"Bad Voltage"—over or under nameplate rating.

QUESTION:
What is the most economical way to eliminate bad voltage?

ANSWER:
An Inductrol* Voltage Regulator, which precisely controls either a-c or d-c voltages. Three types available: motor-operated, hand-operated, automatic (shown left). Has excellent space factor, easy to install, neither affects nor is affected by system power factor. Since it is an induction regulator, it has no brushes, needs essentially no maintenance. Highly reliable.

FOR MORE INFORMATION contact your G-E apparatus representative, or write Section 425-9, General Electric Co., Schenectady 5, N. Y.

*Trademark of General Electric Company for Induction Voltage Regulators.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

such as steam-fitting and the utilities have been assigned green, while moderately hazardous jobs like plastering, lathing, glazing, painting and carpentry, call for white.

Colors for the construction industry have been selected and are being used by workers on the site of the new administration and research center of the Carrier Corp. in Syracuse, N. Y.

Alert orange marks portions of machines or equipment that might cut, crush, shock or otherwise injure a worker, such as structural steel, miscellaneous iron, elevators, metal enclosures and sheet metal.

High-visibility yellow, associated with stumbling, falling or tripping hazards, is effective with concrete, fire-proofing, stone, brick, marble, roofing and carpentry (exterior).

Green, associated with safety and first aid, is marked for utility workers. Precaution blue is used by electrical and air conditioning workers, while general assistants in semi-hazardous occupations, like plasterers, wear white and foremen and stewards, gray. *From a release of the Vat Dye Institute, New York.*

Operating Power Winches

TRUCK-MOUNTED power winches are employed by numerous industries to move, raise or lower heavy loads, from pulling cable or for general work.

Many new trucks come equipped with the winches and along with them this hazard: drivers frequently operate power winches without prior training. Moreover in the past, only large companies had truck-mounted power winches and these concerns had a man trained and assigned to operate the equipment. Now, a truck driver may find himself responsible for the operation of a power winch.

Here are some specific practices and ideas that should be observed in their operation:

1. Persons not familiar with the controls of truck mounted power winches first should check control lever positions against an instruction plate, which should be mounted in clear view of the operator and should

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For maximum strength and long life, all LYON chairs feature channel frame construction, the same as in your automobile. Seats and backs are contoured for real comfort.

STEEL FOLDING CHAIRS, for example. When you buy folding chairs, you're investing in comfortable, safe seating. Compare Lyon chairs by those standards before you buy.

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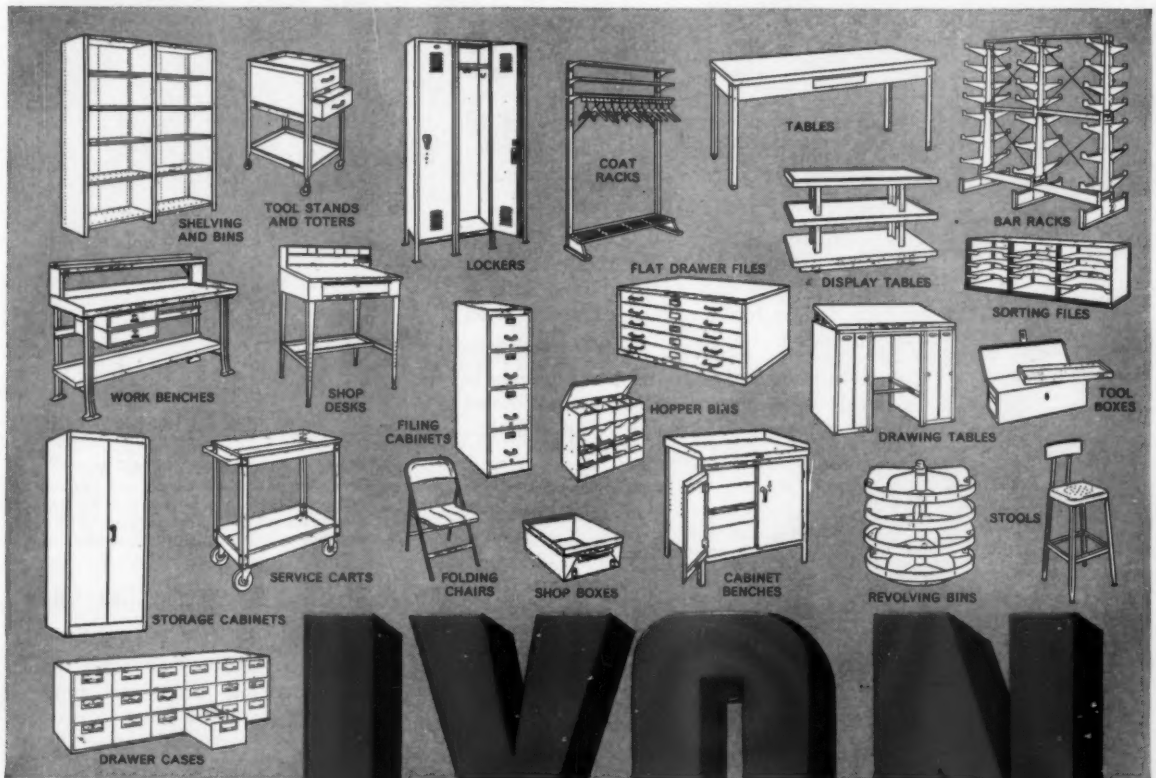

OVER 1500 ITEMS for Business, Industry, Institutions

LYON ®

STEEL EQUIPMENT

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for pumping
ECONOMY
you need
MOTORPUMP
quality

Here's the major point to keep in mind the next time you're ready to order centrifugal pumps . . . year after year the quality of I-R Motorpumps continues to pay off in actual savings through reduced maintenance costs, uninterrupted service and maximum pumping efficiency.

You can always choose the right pump from the wide range of Ingersoll-Rand Motorpump types and sizes, and be sure of modern design features that assure rugged dependability.

Complete information on I-R Motorpumps is available from your nearby Ingersoll-Rand branch office. Or write for latest bulletin.

MOTORPUMP
by
Ingersoll-Rand
11 Broadway, New York 4, N.Y.

9-671

For more facts circle 528 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

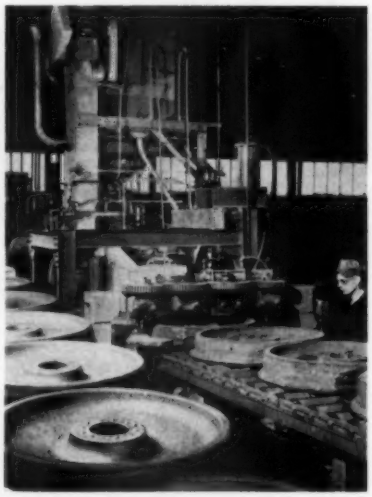
indicate various operating positions.

2. A locker or latch should be provided to keep the power take-off lever in "off" position while the truck is being driven.

3. If a clutch engages so slightly that there is danger of disengaging, air or vacuum devices can be used to hold it engaged and prevent a load from being dropped.

Regardless of the type of installation—back-of-cab or front-of-cab—drivers should be trained to follow a few simple winch-operating safety rules. *From a release of the National Safety Council, Chicago, Ill.*

Quick Cleaning, Peening



Cast steel railroad wheels have heat treat scale removed and are peened at same time in special cabinet, at rate of one a minute. (From a release of Wheelabrator Corporation, Mishawaka, Ind.)

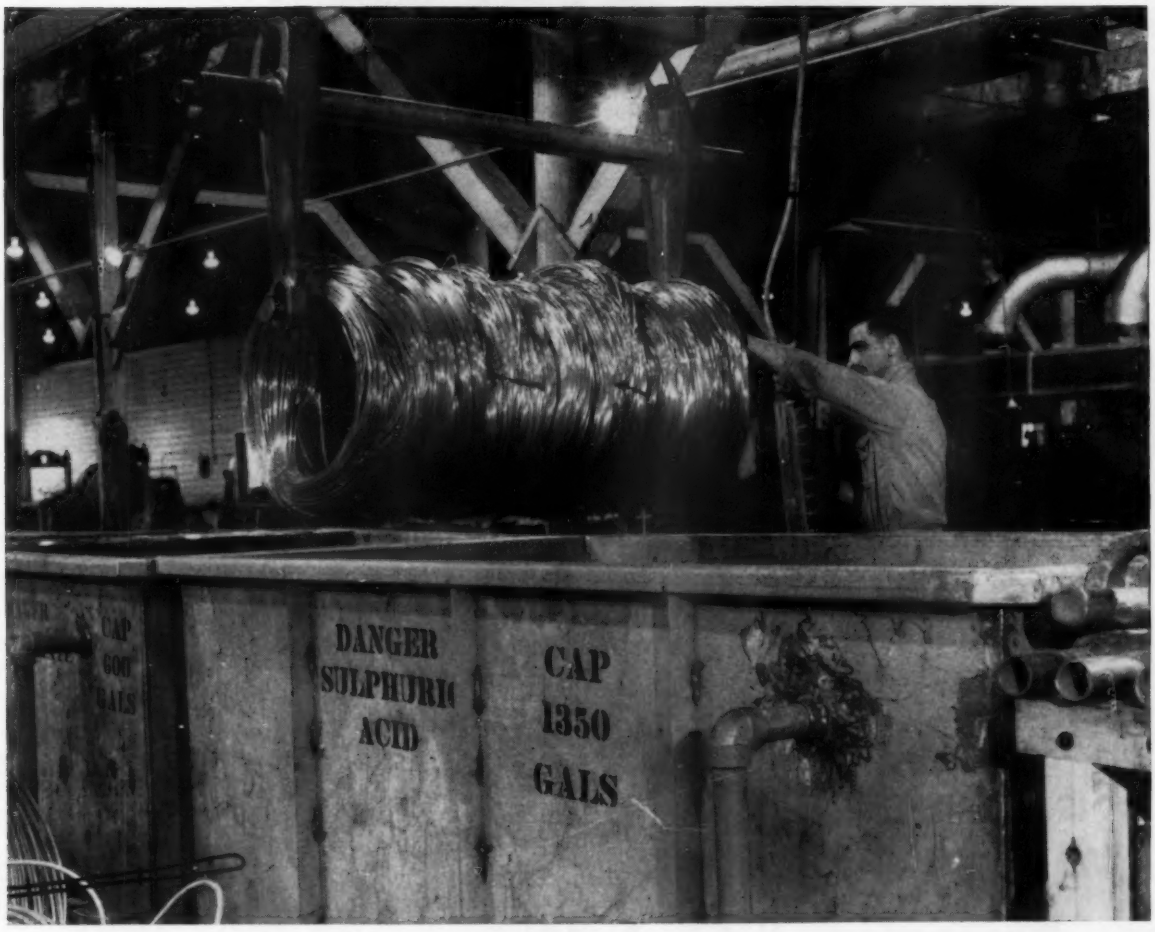
Checklist for Construction Safety

ON ALL OUR CORPORATION'S jobs, the superintendent of construction is responsible for maintaining a continuing program for safeguarding job property.

This is the itemized check-list for fire prevention and protection:

1. Electrical Equipment
   - Switches
   - Insulation
   - Fuses
   - Grounding
2. Matches or Smoking

B.F.Goodrich



Koroseal plumbing for an acid bath

THAT tank contains corrosive sulfuric acid. It's used as a bath for cleaning wire and brass at Bristol Brass Corporation, Bristol, Connecticut. Other tanks contain bichromate and soap solutions.

A siphon method was formerly used to empty these tanks. Looking for a simpler, more efficient means of handling the job, Bristol engineers decided to install drainage pipe of Koroseal rigid polyvinyl chloride. Koroseal pipe was also installed to handle overflow.

Ask Bristol engineers about their experience with this Koroseal installation and they'll tell you how Koroseal PVC increased production, saved time and labor, cut maintenance problems, made possible a much cleaner operation, eliminated spillage and thus reduced acid consumption.

Koroseal PVC pipe is widely used in industry for carrying acids. Koroseal is equally inert to caustics, oils, greases, salts and most industrial chemicals. It lasts indefinitely without deterioration. Rodents will not harm it. Weather and sunlight will not affect it. Because it does not give off any odor or taste, Koroseal also is often used to carry water as well as chemicals.

Koroseal is very light—may be had in the form of pipe, pipe fittings, rods or sheet. It is readily threaded, drilled or sawed. It may be glued or welded together. In short, Koroseal is one of the most versatile, easy to handle materials used by industry today.

For further information on B. F. Goodrich rigid Koroseal PVC simply mail in the handy coupon.

For more facts circle 529 on Reply Card

B.F.Goodrich

INDUSTRIAL PRODUCTS CO.

B. F. Goodrich Industrial Products Co.
Dept. PE-11
Marietta, Ohio

Please send me free booklets on:

☐ Rigid Koroseal Pipe
☐ Rigid Koroseal Sheet

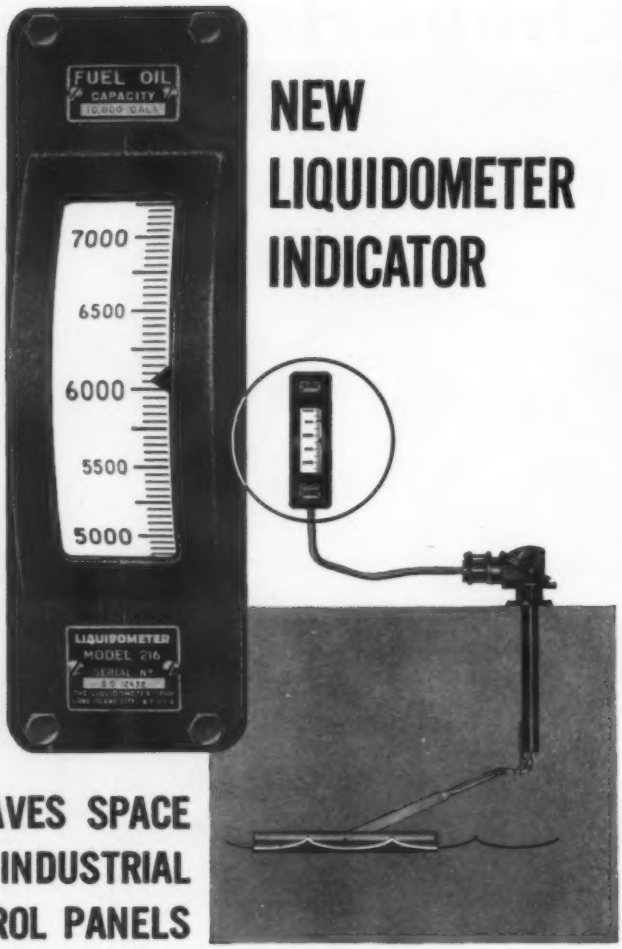
Name_____

Address_____

Company_____

City_____ **Zone**____ **State**____

Koroseal—T. M. Reg. U. S. Pat. Off.



NEW LIQUIDOMETER INDICATOR

SAVES SPACE ON INDUSTRIAL CONTROL PANELS

Twenty-inch dial in 3x10¼" case permits close readings

The new Liquidometer Model 216 Indicator gives the plant engineer a reliable, automatic reading of storage tank contents. Available in either vertical or horizontal design, the compact and highly readable Model 216 Indicator makes possible multiple installations on crowded control panels.

Teamed with Liquidometer's time-tested hydraulic transmission gaging system, the new indicator provides instantaneous remote indication of liquid levels—automatically. No outside power source is required. Virtually any liquid may be measured, and the indicator can be located up to 250 feet from the tank.

Engineered for dependability, the Liquidometer gaging systems highlight these design features:

- Maintenance free
- Integral temperature compensation
- Ease of installation—requires only one 2" diameter tank opening
- Safety—all gages Underwriters approved for hazardous liquids

For further details on the new Model 216 Indicator, write Dept. B.

THE LIQUIDOMETER CORP.
SKILLMAN AVENUE AT 36th STREET
LONG ISLAND CITY 1, NEW YORK

For more facts circle 530 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Confined to places permitted
Safety matches, only, used

3. Heat Hazards
   - No combustible material in contact with steam pipes, furnaces, flues, etc.
   - Ashes in metal containers
   - Care and maintenance of Salamanders and their location
   - Protection of combustible materials, and fire prevention in connection with welding and burning operations
4. Flammable Liquids
   - Handling and use
   - Stored in approved place
   - Safety cans used
   - Tanks, drums and cans in good order
   - No leaks
5. Oil and Paints
   - Stored in approved place
   - No leaks
   - Drippings properly disposed of
6. Combustible Materials
   - Stored in approved bins or containers
7. Oily Rags and Waste
   - In approved metal receptacles
   - Disposed of regularly
8. Gas (including Oxygen and Acetylene)
   - No leaks
   - Turned off when not in use
9. Refuse
   - In approved containers
   - Disposed of daily
10. Lockers and Closets
    - Kept neat
    - No accumulation of rubbish
11. Temporary buildings and contents
    - Housekeeping in and around building
    - Ample spacing between buildings to prevent fire communicating
    - Storage of material and equipment
    - Availability of fire fighting equipment
12. Fire Fighting Equipment
    - In place
    - Easily accessible
    - In working order
    - Sprinkler valves open
    - Sprinkler heads unobstructed

New lithium base

GULFCROWN GREASE

...the one grease that does the work of many

It's a fact—you can use Gulfcrown practically anywhere! On plain or anti-friction bearings. In gear boxes. Outside or inside. You name it, chances are Gulfcrown will lubricate it—but good! Operating conditions can be hot, cold or wet . . . this tough, all-purpose grease does its job regardless.

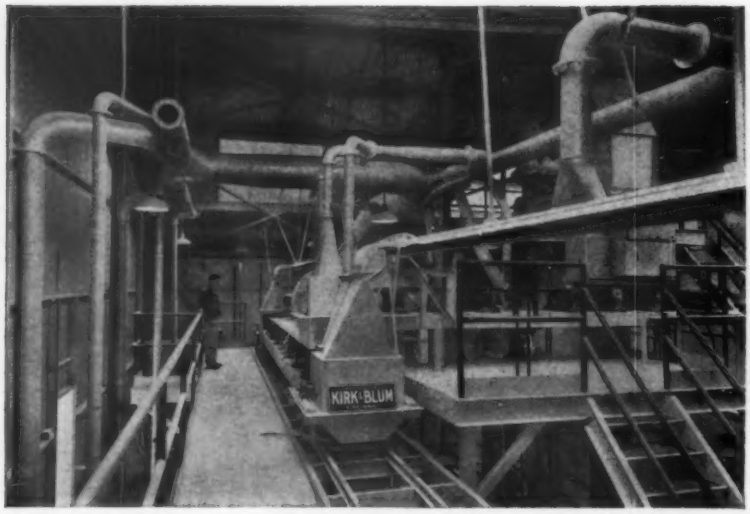
You can see how one multi-purpose grease that does the work of many is a big money-saver. It reduces inventory, cuts lubricating costs and prevents application errors. Check the saving yourself—test Gulfcrown. Ask your Gulf sales engineer or write for free literature.

GULF OIL CORPORATION
Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

For more facts circle 531 on Reply Card



Every "trouble point" is protected by efficiently designed hoods and ducts.

Dust Control
saves many ways at Harbison-Walker

THOROUGH ENGINEERING of a complete dust control system for Harbison-Walker Refactories Co.'s new plant at Leslie, Maryland has resulted in operating efficiencies and other benefits well worth the time and energy required.

The installation has provided (1) dust-free plant air, (2) better operating efficiency, (3) recovery of valuable silica dust, (4) lower plant maintenance and cleaning costs, (5) better working conditions, and (6) no outside air pollution.

Plant-wide system keeps air clean

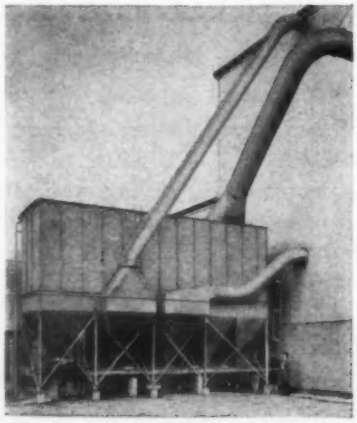
At every point where there is danger of dust being created or escaping into the plant, modern streamlined hoods and ducts are provided, all connected to a central system, powered by a 50 HP motor, capable of handling 25,000 CFM.

Hoods and ducts are placed out of the working area. The system collects air containing silica dust created in the processing of raw silica rock, draws it to a filter, cleans the air, and returns the collected material to bins as a product component.

Waste is eliminated and plant working conditions are kept at a level assuring greater worker productivity.

The complete installation was designed, fabricated and installed by The Kirk & Blum Manufacturing Company, Cincinnati. Information concerning Kirk & Blum Dust Collection Systems may be secured by writing to the company at 3189 Forrer Street, Cincinnati 9, Ohio.

Hoods and ducts are located so as not to interfere with working areas. Keeping plant air clean safeguards workers.



Dust laden air is cleaned in this Multibag filter. Recovered silica dust is returned to mixers for re-use.

For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 36)

Alarms in working order
Checked and tested frequently
From a release of Stone & Webster Engineering Corp., Boston, Mass.

Drinking Fountain

Built-in stainless cooler is streamlined replacement for conventional item at New York architectural firm. Cooler can be installed flush with wall. (From a release of Field Research Division, Paper Cup & Container Inst., New York.)

Shaping Fixture

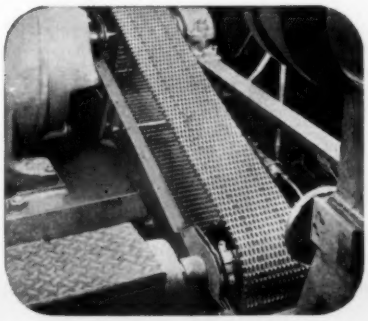
SHAPING of "orange peel" type skin details is simplified with a new tool developed by Martin manufacturing and research engineers. Hand cutting and filing is eliminated. Skin is used in nose of the Matador Missile.

Fixture is made of plastic fiberglass laminate, shaped from a plaster cast conforming to the missile's nose skin contour. Aluminum skin details are placed on the fixture and aligned with tooling pins or positioning tabs located on the oversized edge of the detail. The skin is locked in position by creating a vacuum of 18 psi between the skin and a network of vacuum grooves, with a sealing ring of ¼-in. rubber tubing.

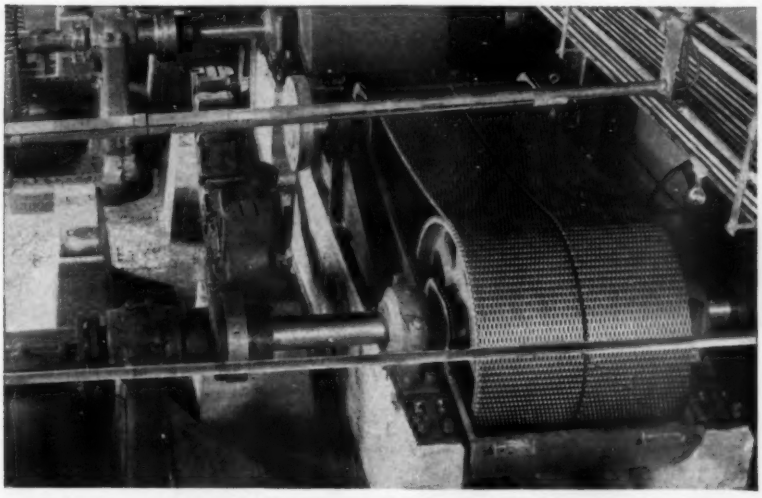
The sides and ends of the shaping fixture are properly angled to lie flat on the shaper table, thereby permitting the shaper blade to cut along the straight trim lines with one adjustment of the blade. *From a release of The Martin Company, Baltimore, Md.*

How LINK-BELT silent chain comes through industry's stiffest tests

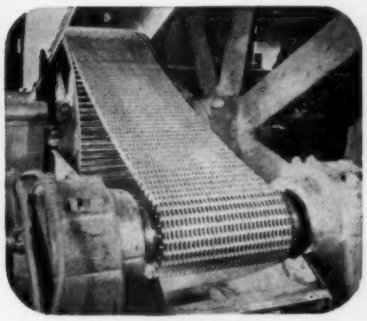
No other drive can do the same



HIGH SPEED. Link-Belt silent chain drives on newspaper presses often operate at speeds of 4000 to 5000 feet per minute.

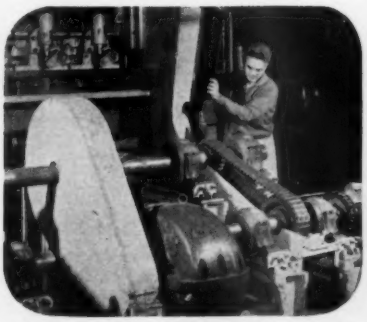


LARGE OR SMALL HP. Two 24-in. strands of Link-Belt silent chain on turbines powering 850-kw generators comprise one of the largest chain drives ever built. Silent chain provides high efficiency (over 98%) on large or fractional hp drives.

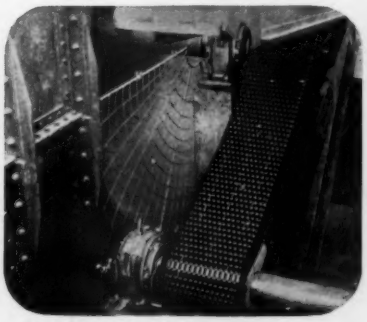


ADVERSE OPERATING CONDITIONS. Effects of heat, humidity and cold are minimized with Link-Belt silent chain drives.

LARGE RATIOS. Link-Belt silent chain operates efficiently at ratios as high as 10-to-1, with resulting space economies.



LIMITED SPACE. Easy to assemble in close quarters, Link-Belt silent chain permits built-in drives, compact housings.



LONG LIFE. Link-Belt silent chain has given more than 30 years of uninterrupted service on ventilating systems.

Ask your Link-Belt office or authorized stock-carrying distributor for

88-page Book 2425

LINK-BELT

SILVERSTREAK SILENT CHAIN DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,800

For more facts circle 533 on Reply Card

NEW!

SAFE!

New Glasfloss *Safety-Grille* Filters have been thoroughly tested in industrial and commercial installations. Users report complete satisfaction in all types of high-velocity, high moisture-content and extra-dirty applications. These new filters eliminate danger of cut hands and wrists from sharp or broken metal grilles. New chipboard grille is stronger, resilient when bent, provides effective filtering in all types of installations.

Glasfloss* fiber glass Safety-Grille* filter

TRADE MARK

stronger... tested in service... UL approved

Now, Glasfloss Fiber Glass Filters have a new design. The old-type metal grille has been replaced completely by a new chipboard grille, providing you with a filter that is safer to handle, stronger in design, and highly efficient.

CHECK THESE FEATURES—

1. **SAFER**—New Glasfloss chipboard grille eliminates danger to maintenance personnel of cut hands or infections caused by sharp or broken edges of metal grilles.
2. **STRONGER**—Chipboard grille and frame are one die-cut section; Glasfloss engineered-type construction gives added strength. This means less chance of filter damage in transit, in storage, in handling.
3. **EASIER DISPOSAL**—Used Glasfloss *Safety-Grille* Filters can now be rolled up for quick, simple trash disposal. No more stiff metal grilles!
4. **EFFICIENT**—Available filtering area and initial pressure drop of new Glasfloss *Safety-Grille* Filters are the same as old-type metal grille filters.
5. **TESTED IN SERVICE**—Glasfloss *Safety-Grille* Filters have been tested and proved in service in a variety of industrial and commercial applications.
6. **APPROVED**—Glasfloss Fiber Glass *Safety-Grille* Filters have been approved by Underwriters' Laboratories, Inc.

Don't wait! Test these new filters in your own plant or building now! Get top filtering results—and all these extra features—with Glasfloss. The new Glasfloss Fiber Glass *Safety-Grille* Filters are now available in a complete range of sizes from your local distributor or your nearby PPG Warehouse.

A PRODUCT OF PITTSBURGH PLATE GLASS COMPANY

Sales offices are located in the following cities: Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh and St. Louis

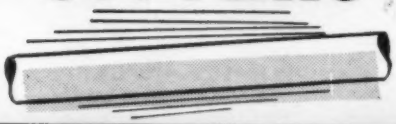
FIBER PPG GLASS PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

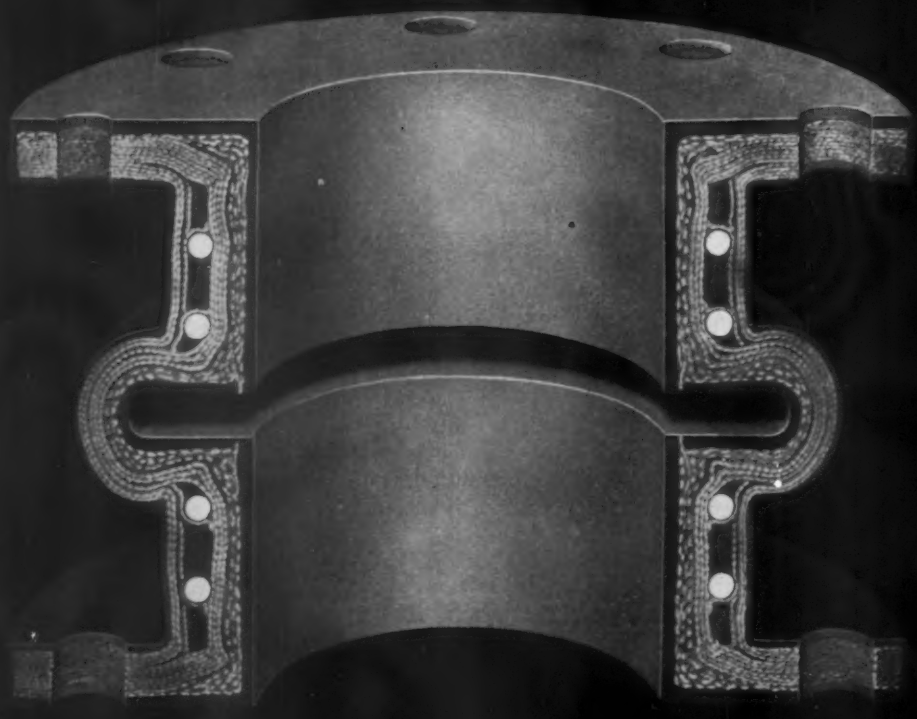
PITTSBURGH PLATE GLASS COMPANY

For more facts circle 534 on Reply Card

ONE OF THE GARLOCK 2,000

Stop Pipe Line "JITTERS"

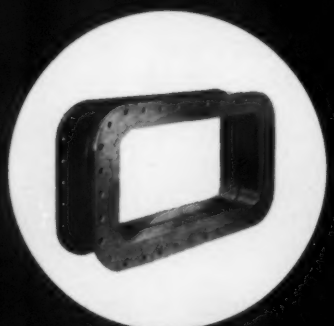




Cutaway of Garlock Rubber Expansion Joint shows steel reinforcing rings which vary in number with size of joint.

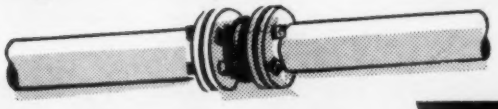
Expansion Joint with Teflon liner for moderate pressure service handling liquids or gases harmful to rubbers.

Garlock All-Teflon Expansion Joints for low pressure service handling pure foods, acids, caustics, etc.

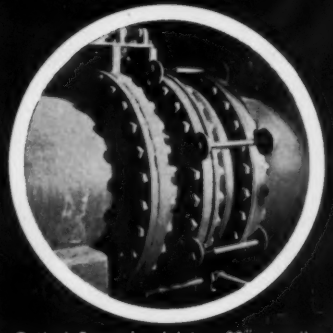


Rectangular Expansion Joints are often used as connection between a turbine and condenser, or for blower ducts.

with Garlock Expansion Joints



Garlock Expansion Joint on 2½" suction and discharge pipes of oil pumps.



Garlock Expansion Joint on 30" pipe line connecting propeller-type circulating water pumps.

This king-size Expansion Joint is used on the world's largest steam generating plant at Kingston, Tenn. It is 60" dia. and is installed between condenser and concrete imbedded water piping.

VIBRATION, NOISE, AND FLANGE BREAKAGE CAN BE ELIMINATED by installing the right Garlock Expansion Joint in your piping. And, the right size and type expansion joint is available for service handling any liquid or gas. For example:

TYPE	USE
• Rubber Expansion Joints (Spool-type, U-type, Tapered, Offset)	Hot or cold water Mild acids or caustics Brine, air, exhaust steam
• Neoprene Expansion Joints	Oil Other Petroleum Derivatives
• Teflon*-lined Rubber Expansion Joints • All-Teflon Bellows-type Expansion Joints	Strong acids and caustics Halogenated Solvents Pure Foods

Rubber Expansion Joints are another important part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for every need. The *only* complete line. That's why you get *unbiased* recommendations from your Garlock representative. Call him or write for Rubber Expansion Joint Folder AD-137.

THE GARLOCK PACKING COMPANY, Palmyra, New York

For Prompt Service, *contact one of our 30 sales offices and warehouses throughout the U.S. and Canada.*

*Du Pont Trademark

GARLOCK

Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

For more facts circle 535 on Reply Card

OPERATION AND PRODUCTION —pointers for the industrial plant engineer

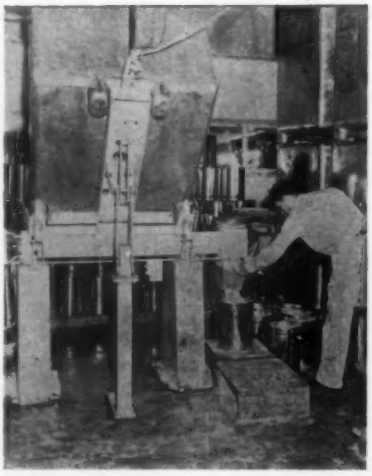
Edited by Vernon T. Kempf

Bulk Handling Saves $15,000

USING 14 HERMETICALLY-SEALED aluminum Tote bins and one discharge mechanism, the New Jersey plant of M. Polaner & Sons is realizing approximately $15,000 annually in direct savings in the bulk handling of sugar. The savings has enabled this manufacturer of jams, jellies and preserves to amortize its bulk-handling system in less than two years.

Until the purchase of the 14 bins in 1955, Polaner had been receiving sugar in 25-lb bags, paying a 15 per cent per cwt premium over normal bagged sugar operations. This had been done because formulations call for multiples of 25 lb of sugar per batch.

This premium, plus normal 25 cent per cwt charges, was eliminated with the Tote system. By utilizing a common carrier contract trucker, another five cents per cwt over normal refinery trucker costs was saved. This total of 45 cents per cwt savings on 7000 lb of sugar used daily rapidly mounts up to $14,580 annually.



Tilting mechanism and screw conveyor unload bins of sugar into 25-lb cans

Receipt of bagged sugar by refinery trucks took place three times weekly and tied up the receiving dock and two men an hour each trip. At present the Tote bins, manufactured by the Tote System, Inc., Beatrice, Nebraska, arrive once a week and are unloaded by one man in less than an hour. This labor saving is conservatively estimated at $390.00 annually.

Aluminum Reduces Roof Repairs

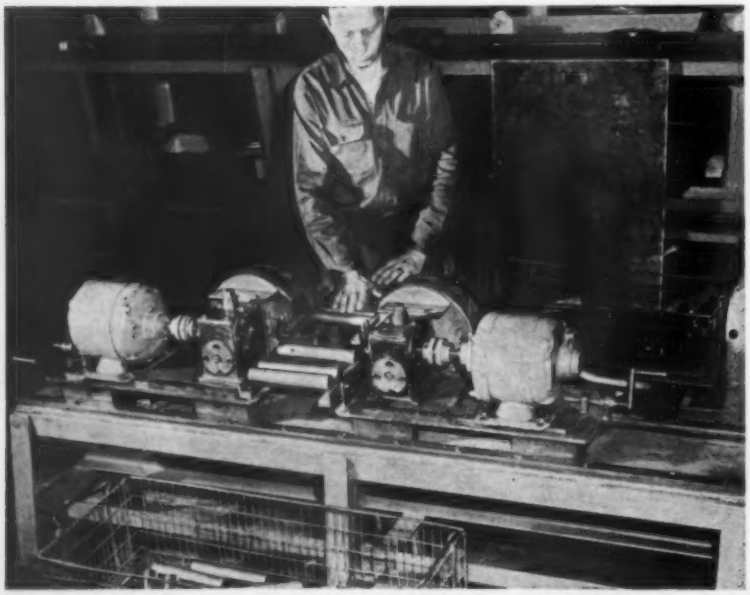
COSTLY MAINTENANCE PROBLEM of repairing the roofing on two huge airship hangars at Moffett Field, Calif., is being solved by the U. S. Navy with industrial corrugated aluminum sheet.

More than 600,000 lb of corrugated aluminum roofing and flashing

(Continued on page 54)

Shop-Built Deburring Machine Increases Production 400 Per Cent

QUALITY CONTROL STANDARDS at the Calument & Hecla's Wolverine Tube Division plants call for careful removal of all burrs from both ID and OD of all tubing cut into short lengths before shipment to the customer. This was formerly done either by hand brushing or by holding the tubes against a power wire brush.

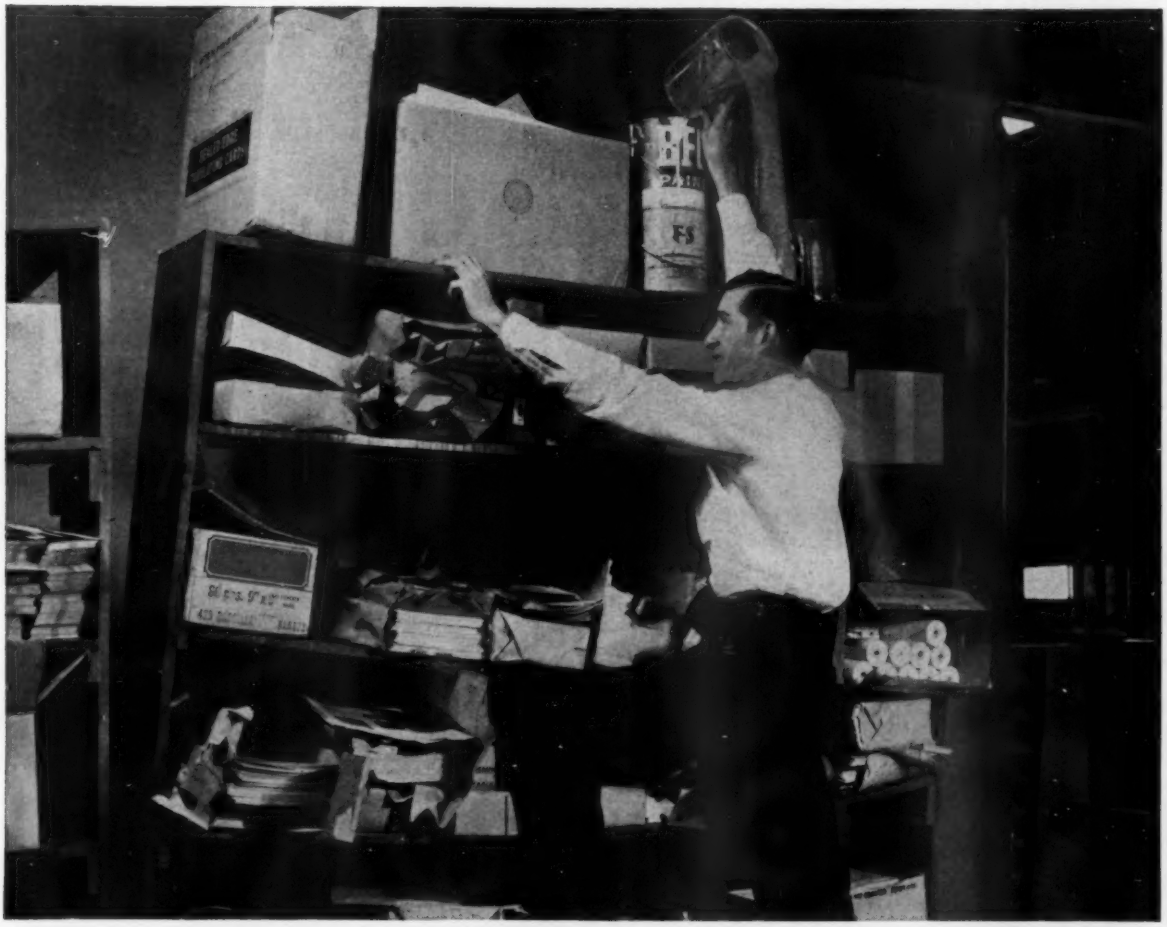


Operator feeds tubes into guide rails at back. Tubes run down rails past brushes and out at front. Angle iron at operator's right hand, holds tubes down and is quickly set for height. Entire brush unit, at right, slides on the table tracks

As a part of a cost reduction program, an arrangement was devised that sharply increased the rate at which tube ends could be deburred. The shop-designed unit is a double-ended wire brush burring machine. Each brush is actually two brushes mounted on one spindle. Each assembly of motor, gear set, and brush is mounted on a movable base so that varying lengths of tubing can be accommodated. The two bases are supported by a welded, angle iron section work table, the top of which is grooved to permit the bases to slide apart or together as needed.

In operation, a number of tube lengths are placed on the feed guide rails and are pushed past the brushes spinning at 1850 rpm. Each brush set is direct geared to ¾-hp motor. The slight pushing action causes the spinning of the brushes to rotate the tubes as they pass the brushes. This results in uniform deburring action around the perimeter of the tube.

QUICK! *"Call the Deluxe Dealer— we have a shelving problem!"*



Exaggerated picture? Sure . . . but any one of these shelving problems may be troubling you . . . sagging shelves, insufficient storage space, inflexible wooden shelving, poor layout. To cure your shelving problems, call your Deluxe steel shelving dealer. He will engineer efficient and flexible shelving installations, then supply you with additional shelving racks as fast as you need them! Deluxe dealers are backed by the finest-designed and sturdiest shelving made.

These Deluxe features allow you to install Deluxe shelving at lowest cost.

1. One-piece bin type uprights—for greater rigidity, faster erection.
2. Boltless adjustable shelf brackets—complete adjustability without tools.
3. Snap-in dividers—for quick flexibility.
4. Factory-embedded shelf reinforcing—to cut down installation time
5. Coped shelf corners increase storage capacity.

DELUXE
STEEL SHELVING

DELUXE METAL FURNITURE COMPANY · WARREN, PA.

A Division of the Royal Metal Manufacturing Company

Look for your Deluxe dealer under *Shelving* in the yellow pages of your telephone directory or write to the factory for the name of the dealer nearest you and the colorful "Shelving Reference Manual."

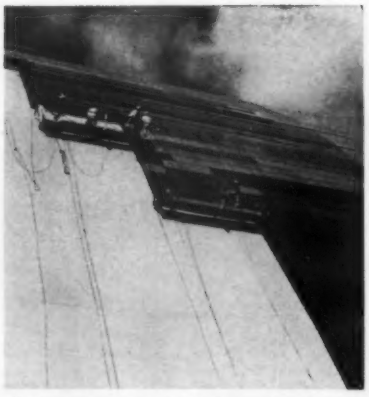
For more facts circle 536 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

sheet is being installed on the roof of the two humped-back hangars. Each hangar has a roof area of approximately nine and one half acres and enough floor area to hold nine Navy blimps.

Both roofs are being covered with stucco embossed corrugated Alclad 3004 alloy aluminum which has been alodized. This grade of sheet has a high resistance to corrosion and the embossed texture and green color cut down reflection. In addition, the material together with the new underlayment of asphaltic felt is one half lb per sq ft lighter than the old composition roofing and no alteration to the existing structural framework is required for the new roof.



Sixteen man crew, working from scaffolds on both sides of the hangar, apply sheets at a rate of 400 to 450 a day

All the aluminum sheets were shipped from Kaiser Aluminum's Trentwood, Washington, rolling mill 45⅝ in. wide and in a variety of lengths between six and 12 ft. The metal is 0.032 gage with ⅞ in. deep corrugations having 2.67 pitch. The sheet weighs approximately 55 lb per sq ft.

Shoemaker's Method Strips Costs

SPONGE RUBBER SHEETS are being stripped to size at The Martin Company by a cutting method similar to that employed by shoemakers. This cutting operation, which has increased production output by 87 per cent, utilizes a machine which cuts the sheet material into straight-edged strips of uniform size.

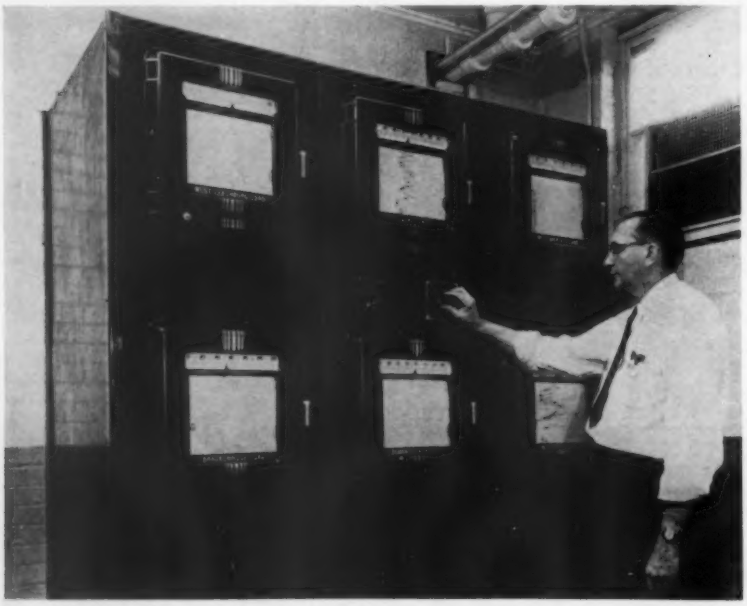
When performed by hand and without the aid of the cutting machine, this same operation required a longer period for setting up and actual cutting. The tools used in the former method consisted of a razor blade, a metal cutting-edge, clamps and a measuring instrument. The sheet rubber was clamped underneath the metal cutting-edge, meas-

(Continued on page 56)

Control Demand To Reduce Costs $30,000 Monthly

AUTOMATIC LOAD CONTROL on electric furnaces saved $4,750 in demand charges during the first month's operation at Allegheny Ludlum Steel Corp. During this same month, Allegheny consumed 400,000 kwhr more energy, yet their net bill was $3,150 less than the previous month. Currently the company estimates savings at 20,000 kw or about $30,000 per month.

For electric melting furnaces, Allegheny bought electric power that peaked to well over 100 megawatts, if unregulated. Their total power bill consisted of a 15-minute demand charge at $1.80 per kva per month and an energy charge of $0.004 per kwhr. Analysis of their load curve showed that substantial savings should result if demand were reduced, and that this could be done without reduction of steel production.



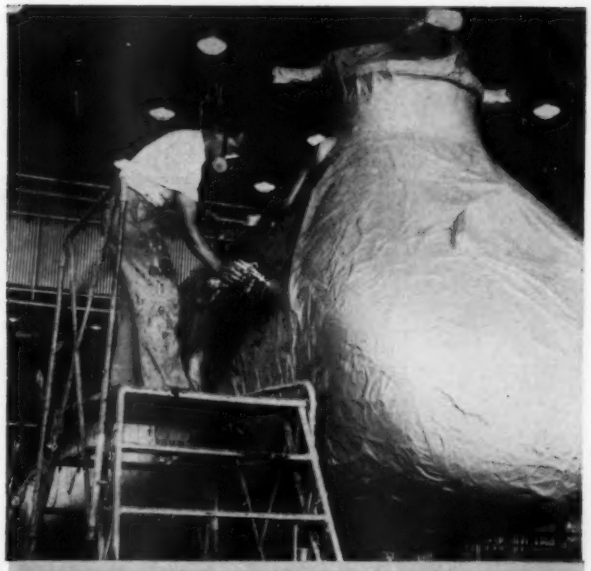
Load measurements from two isolated plants are transmitted to this central control panel providing automatic control and load recordings for demand reduction

A load control system was installed to regulate the 15-minute demand rather than the instantaneous kw. This control integrates the kwhr excess over the desired demand period and then automatically determines the required load reduction. If load trend indicates that the schedule will be exceeded, the regulator resets controls on the electric furnaces, reducing their load. The control automatically selects the furnaces which are melting, creating excess demand, without disturbing the furnaces under refining operation.

The control, furnished by Leeds and Northrup, now regulates demand at about 70,000 kw. On a monthly average, peak demands fall within 1500 kw of this value. In one month the five peak demands were within 1000 kw of each other, resulting in a real savings in demand charges plus maximum consumption of kwhr. The experience and savings to date indicate that the demand control equipment will pay for itself in less than six months.

FULLER ALUMINUM PLASTIC COATING SEALS AGAINST CORROSION— CAN BE STRIPPED OFF IN MINUTES

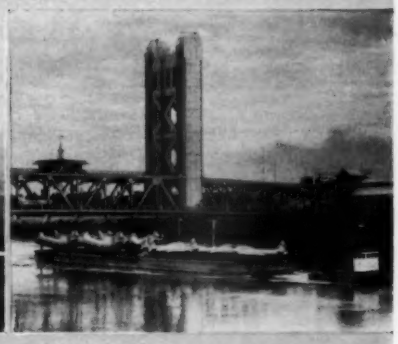
Spray-on preservative protects delicate aircraft during shipment overseas



Stripped down helicopter gets spray application of Fuller Aluminum-Pigmented Coating, will have weatherproof shell .03-in. thick. Coating is manufactured by **W. P. Fuller & Company**, San Francisco, California.

Protected whirlybirds are towed from Base to AF river docks.

Aluminum-coated aircraft swings from dock to river barge.



Bargeload heads for ocean freighters, then service overseas.

Maintenance experts everywhere today are hailing a foolproof, economical method of protecting sensitive equipment in storage. Sprayable vinyl plastic made with ALCOA® Aluminum Pigment is quick and economical to apply, strips off in minutes after use, costs 60% less than old rust preventive, grease coating methods.

A dramatic example of this technique can be seen at McClellan AFB, California. Here, Fuller Aluminum Plastic Coating is sprayed on aircraft before shipment overseas. Despite exposure to wind, sun, and salt spray, planes arrive at destination in perfect condition. The protective skin is peeled off quickly by hand and the plane is virtually ready to fly. More, base officials report that the reflective aluminum coating turns back the sun's heat rays. Tests show that metal surfaces stay 10 to 15 per cent cooler when covered with this material.

If you are charged with protecting valuable, vulnerable parts and equipment, find out more about economical, easy-to-apply aluminum plastic coatings.

ALCOA does not make spray-on protective coatings, but we will be happy to refer you to reputable manufacturers who do. Write today for our two free booklets, *Painting With Aluminum* and *Aluminum Asphalt Roof Coatings Make Time Stand Still.* Use the coupon.

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Please send more information about aluminum strippable coatings. Also, send FREE booklets, *Painting With Aluminum* and *Aluminum Asphalt Roof Coatings Make Time Stand Still.*

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Company_____

Address_____

City_____ Zone____ State_____

For more facts circle 537 on Reply Card

Before you buy any boiler compare quoted prices with REAL COSTS

New Cleaver-Brooks cost analyzer clears "quotation" confusion — reveals ALL costs

Get *all* the costs . . . the *real* costs . . . down on paper before you recommend or specify a boiler to your clients. On many boiler installations "quoted prices" seldom agree with the total costs, as you may have learned. This is frequently the case with so-called "built-up" boilers assembled on the site.

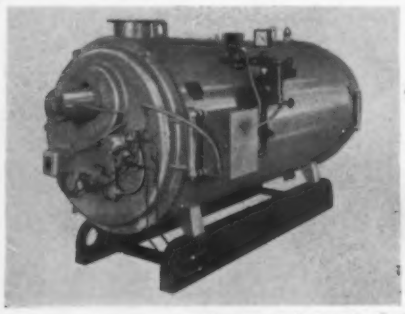
Cleaver-Brooks' cost analysis enables you to compare all material costs (boiler, steam trim, burner, refractory, controls and other equipment) and installation labor costs. You'll know the "real costs" on the complete installation before you start.

Real eye-opener

The figures you'll see may be startling. In most cases the cost analysis proves a Cleaver-Brooks costs *less*. On-job time is drastically reduced because Cleaver-Brooks packaged units are fully assembled, ready to install. Cleaver-Brooks boilers give you more in performance, too . . . each boiler is fully fire-tested at the factory under load, tuned to peak economy. Starting service and on-the-job operator training by authorized field engineers further decreases your over-all costs.

Contact your Cleaver-Brooks agent

Once you add up all the benefits of a Cleaver-Brooks "one-cost" package . . . the proved trouble-free economy of exclusive four-pass, forced-draft design, you'll find it pays over and over to analyze costs carefully before you buy. See your Cleaver-Brooks agent for details or write Cleaver-Brooks Company, 364 East Keefe Avenue, Milwaukee 12, Wisconsin, Dept. M.



Choose from 19 sizes, 130 models, 15 to 600 hp. Oil, gas and combination oil/gas fired — steam or hot water for heating or processing.

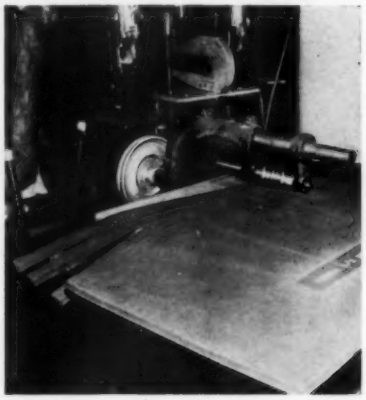
Cleaver Brooks

ORIGINATORS OF SELF-CONTAINED BOILERS

For more facts circle 538 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 52)



Operator guides sheet along a preset guide, cutting three strips at one pass

ured according to the thickness and length desired and then cut with the razor blade.

With the new method the lengthy set-up time, the ragged edges and the irregular-cut sizes were virtually eliminated. An added advantage is "gang cutting," allowing several strips to be cut at the same time.

$10.00 Reward

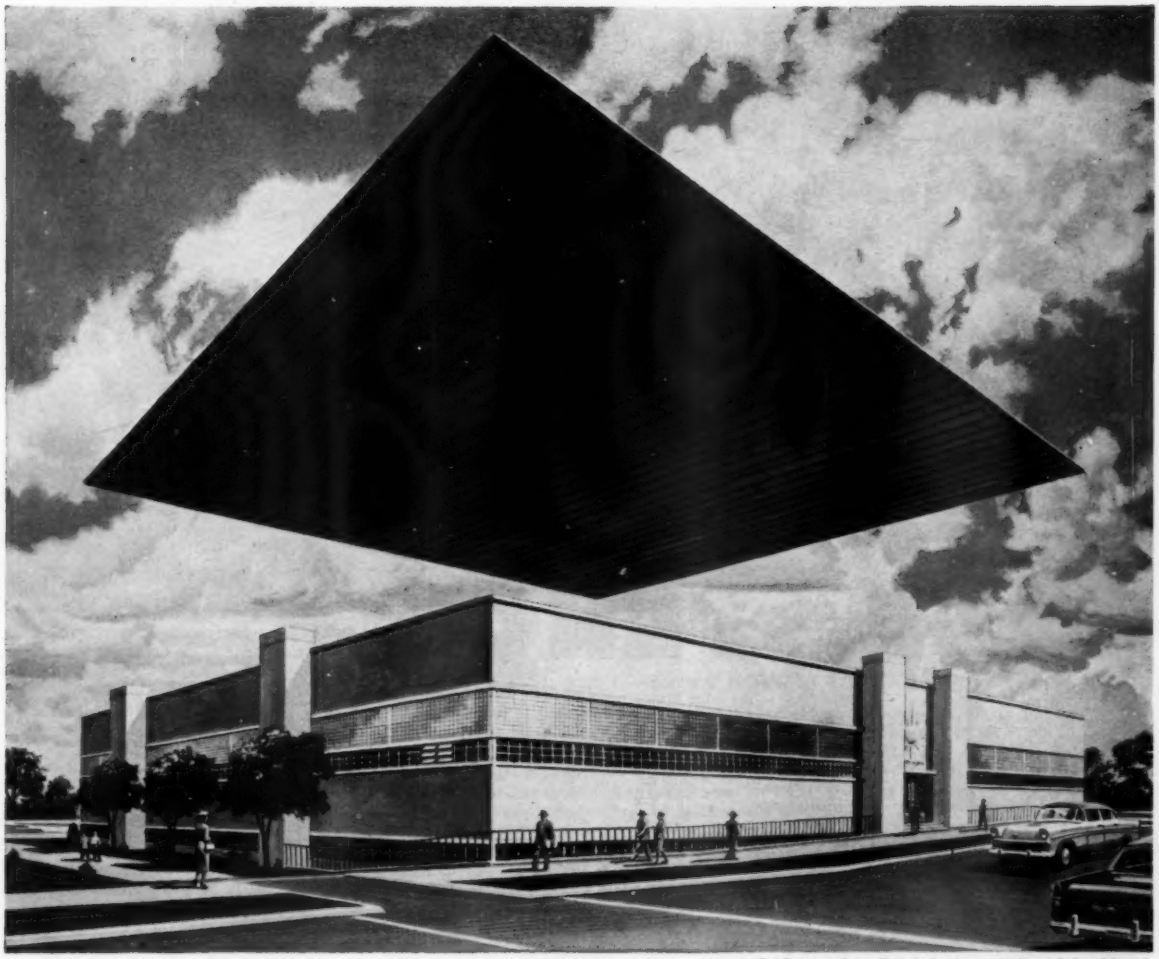
WANTED . . . . Items of interest to plant engineers.

PLANT ENGINEERING will pay $10.00 minimum for each item accepted for publication. These items should describe a useful improvement or modification to plant equipment and buildings or more efficient use of any facilities. Where applicable, items should be accompanied by a sketch and/or a photograph. Send all entries to Editor, PLANT ENGINEERING, 308 East James Street, Barrington, Illinois.

Conveyor Does Two Jobs

CONVEYOR SYSTEM, rigged to a hydraulic press brake, speeds up production of aluminum window frames at Coast Aluminum Company, Gardena, California. Extrusions are conveyed from the stock piles to the operator at the press.

The press is arranged with double



J-M Aquadam Roofs for low pitch and dead level roof decks give the best possible protection.

For lasting protection to buildings and contents

Specify Johns-Manville Aquadam® Built-Up Roofs——and be sure

The safety and protection of your equipment and the building itself depends upon the roof. A good roof is vital for keeping out beating rain, melting snow and ice. J-M Aquadam roofs do more than meet these weatherproofing requirements.

Johns-Manville Aquadam Built-Up Roofs owe their weatherproofing superiority to Aquadam, the modern cementing agent used in the application of felts.

Aquadam's exceptionally high adhesive and permanent bonding properties have twice the ability of typical asphalts to retain initial properties on exposure to the weather.

Of equal importance, a good roof must resist the drying-out action of the sun's heat. Without proper protection from the rays of the sun the roof will fail.

Asbestos felts in Aquadam smooth-surface built-up roofs, gravel or slag on Aquadam rag-felt built-up roofs, protect the underlying waterproofing bitumens from the drying-out action of the sun.

When considering re-roofing or buying a new roof, specify a J-M Aquadam Built-Up Roof. You'll assure your building and its contents of long-lasting protection. Your Approved Johns-Manville Roofing Contractor is listed in the classified section of the telephone directory.

For complete details about Aquadam Built-Up Roofs, write: Johns-Manville, Box 158, New York 16, N. Y. In Canada, write: 565 Lakeshore Road East, Port Credit, Ontario.

JOHNS-MANVILLE JM PRODUCTS **Johns-Manville**

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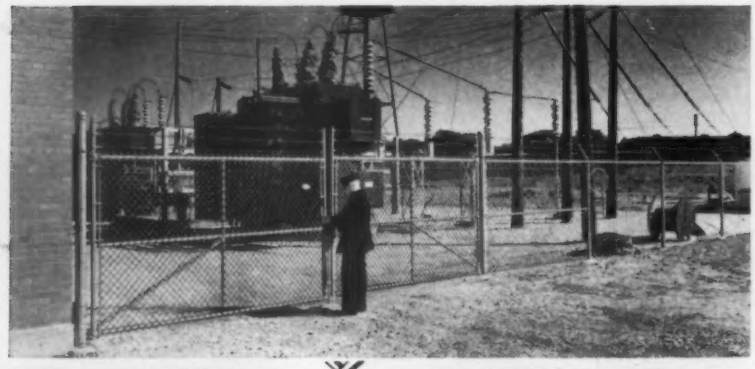
How to Get More for Your Fencing Dollars...

PAGE Offers the Widest Choice to Best Meet Your Needs!



PAGE chain link FENCE

America's First Wire Fence—since 1883

Your property protection should be and can be MORE than just a fence. It can be the RIGHT fence for you because you can make decisions from the widest variety of choices available anywhere. Every part of your fence will be quality controlled by PAGE from metal billet to the complete, erected fence.

You can choose from —

- 8 Fence Styles
- 8 Fence Heights
- 4 Fabric Metals
- 2 Types Metal Posts
- 6 Gate Styles, Many Widths
- Single or Double Barbed Wire Arms
- Top Rail or Top Wire

Important Advantages for You

PAGE pioneered in providing a wider choice of long-lasting fence fabric metals. Each of them possesses characteristics which meet individual preferences or make it more suitable to meet certain climatic or service conditions.

GALVANIZED STEEL • PAGE fabric of this class is woven of time-proved basic open-hearth steel wire, hot-dip galvanized after weaving to assure long, reliable service.

ALUMINIZED STEEL • By a PAGE patented process a coating of commercially pure aluminum is bonded to steel wire to provide longer corrosion resistance, yet its cost is comparable with fence fabric having shorter life expectancy.

ALUMINUM • Another material in the non-corrosive class. It will not rust nor will it discolor materially under unfavorable conditions. Because of the PAGE method of semi-flat weaving it has exceptional strength.

STAINLESS STEEL • This special chrome-nickel fence fabric is immune to practically all corrosive elements and is particularly advantageous near salt water and where the air is laden with smoke, sulphur or other factory emissions.

MANY STYLES—MANY VARIATIONS • Ready to meet your needs are 8 styles, varied by heights, gauges of fabric wire, units of supporting structure, types of gates (all with welded frames) and barbed wire strands for added security.

ALSO VERY IMPORTANT • The superior quality of materials and the specialized production skills represented by all PAGE FENCE parts are matched by the capable planning and expertness with which your fence will be erected. The Association member firm nearest you will confer with you on all details, offer sound recommendations and submit cost estimates without obligation. This localized firm has continuing interest in every fence it erects.

Write or send coupon for full information. With it we will send name of Association Member nearest you.

PAGE FENCE ASSOCIATION, Dept. PE, Monessen, Pa.
Please send me detailed information on PAGE CHAIN LINK FENCE

NAME_____

POSITION_____

COMPANY_____

CITY, ZONE & STATE_____

A PRODUCT OF PAGE STEEL & WIRE DIVISION, AMERICAN CHAIN & CABLE CO., INC.

For more facts circle 540 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

Conveyor positions material from stock pile in front of operator and carries finished parts away to welding section

rows to punch guide holes in the back row and cut the pieces into four separate lengths in the front row. The operator places the stock length in the back row to punch the guide holes. He then moves this part to the front row and places a new stock length in the back row. On the next cycle of the press the front part is cut into four parts and the guide holes are punched into the part in the back row.

The cut parts drop onto the conveyor and are carried to the welding section to make completed frames.

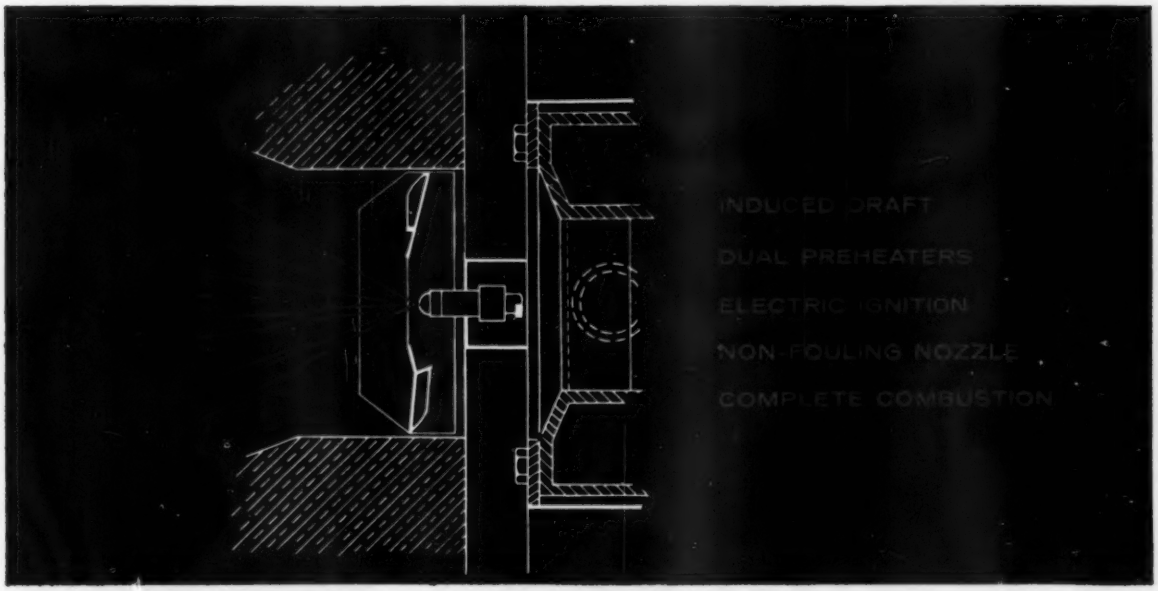
The hydraulic press brake used in this operation is manufactured by Pacific Industrial Manufacturing Company, Oakland, California.

Stop Hot Water Line Losses

HOT WATER HEAT LOSS, resulting from water cooling in many long lengths of pipe, has been eliminated by the Electric Controller & Manufacturing Company, Cleveland, Ohio, with the installation of a variety of water heating equipment throughout the firm's new 250,000 sq ft plant.

A study proved it was more economical to run gas and cold water lines for long distances than to extend hot water lines from a central source of supply.

Two Ruud multi-coil gas water heaters were installed near the gen-



NEW PYROJET BURNS NO. 5 OIL WITH GUARANTEED EFFICIENCY

If your facilities are designed for No. 5 oil, Dravo's new *Counterflo* Space Heater with PYROJET burner will handle all grades of No. 5 oil efficiently and dependably. The dual pre-heating system brings hot oil out to the tip of the nozzle. Simplified electric ignition system provides smooth, dependable starts. With burner efficiency guaranteed for all grades of No. 5, a new level of heating economy is available.

Dravo Space Heaters with induced draft PYROJET burner are also available in gas or gas/light oil burning models. New stainless steel air-foil combustion chamber raises heat transfer efficiency. Ask your Dravo representative for expert advice on your heating problem, or write Dravo Corporation, Dravo Building, Pittsburgh 22, Pa.

DRAVO

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GET ALL THE FACTS ON LOW COST HEATING—WRITE FOR BULLETIN 564...

DRAVO

Blast furnace blowers • boiler and power plants • bridge sub-structures • cab conditioners • docks and unloaders • dredging • fabricated piping foundations • gantry and floating cranes • gas and oil pumping stations • locks and dams • ore and coal bridges • process equipment • pumphouses and intakes • river sand and gravel • sintering plants • slopes, shafts, tunnels • space heaters • steel grating • towboats, barges, river transportation

For more facts circle 541 on Reply Card

CM METEOR Electric Wire Rope Hoist

½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous hoist-duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control.

CM HOISTS

FOR { REPETITIVE PRODUCTION APPLICATIONS OR RUGGED MAINTENANCE WORK

HAND or ELECTRIC—CHAIN or WIRE ROPE

CM makes them all! So you can choose a hoist that's perfectly suited to your own needs in a safe, highly efficient CM design. Three of the most popular models are illustrated. Specifications of other types and sizes on request.

CM LODESTAR Electric Chain Hoist

⅛ to 1 ton capacities—First truly heavy duty version of small electric hoist. ¼ ton model weighs only 51 lbs. Heavy duty self-adjusting mechanical brake and regenerative electrical braking. Overload protection and upper-lower safety switches. CM-Alloy load chain.

CM CYCLONE Hand Chain Hoist

¼ to 10 ton capacities—Easy to carry and lift. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

ALSO CM Pullers, Trolleys and Cranes

CALL the CM distributor for catalog, prices and fast delivery from stock. →

CM HOISTS AND CHAIN

CHISHOLM-MOORE HOIST DIVISION

COLUMBUS McKINNON CHAIN CORPORATION

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For more facts circle 542 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

Roy Alexander, Supervisor of Maintenance, checks heater for wash stands

eral office and cafeteria to supply 140 F hot water for kitchen sinks, lavatories and showers. A booster gas water heater, in the same location, raises 140 F water to 180 F for an automatic dishwasher. At other locations, units provide hot water for wash fountains and showers in the employee rest rooms.

Drag Line Speeds Freight

OVER 1200 CARTS operate with a 1400-ft continuous under-floor drag line to move 2 million lb of freight daily at the Los Angeles terminal of Pacific Intermountain Express. The carts are used for loading and un-

Each cart is pulled from the drag line at a specific bay where trailers are being loaded or unloaded. All shipping papers for the freight on each cart are put into a tube at the front of the cart

IT'S EC&M FOR A COMPLETE LINE OF SYNCHRONOUS MOTOR STARTERS!

FOR ALL LOW VOLTAGES AND FOR 2200-4800 VOLT POWER SYSTEMS!

Here's Why EC&M Pushbutton Automatic Starters Do The Job Better...

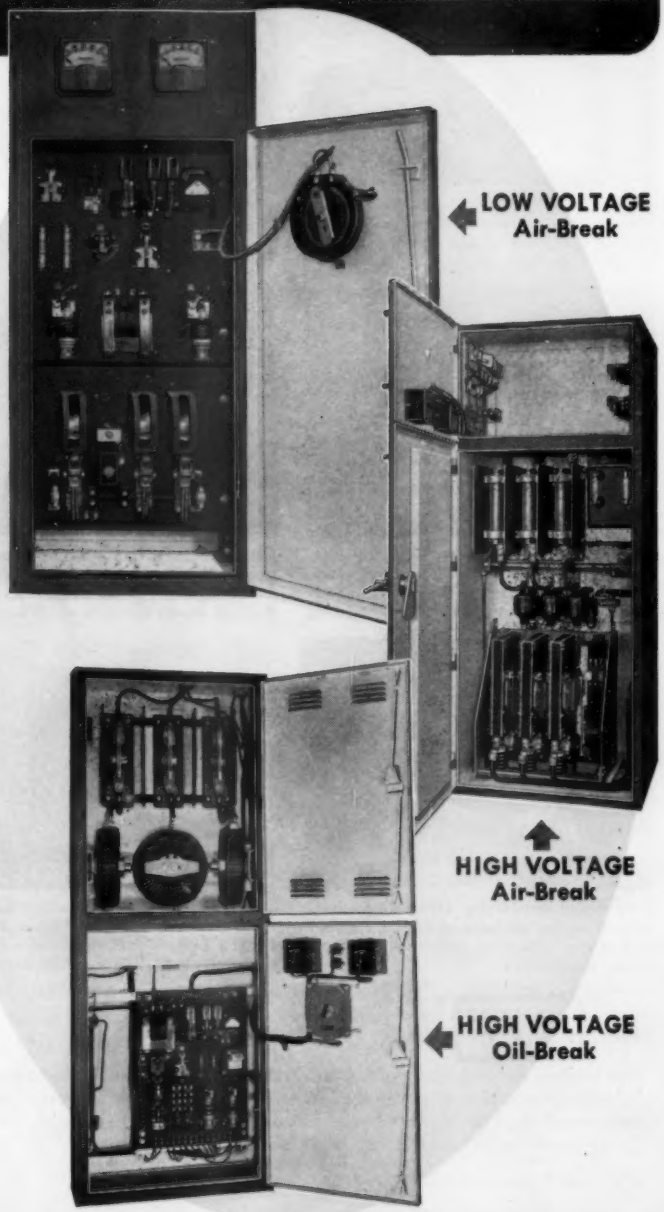
Complete protection during starting, acceleration and while running at synchronous speed.

Motor pulls into step without delay because field is applied under best conditions for synchronization.

Automatic field removal and re-synchronization allow motor to accelerate and re-synchronize after voltage dip or momentary overload.

Easily installed because all internal wiring is complete.

Full or reduced voltage starting All high voltage starters available in 3 ratings: (*1*) 50,000 KVA (certified) interrupting capacity—(*2*) with power-type, current-limiting fuses —(*3*) VALIMITOR® (volt-ampere-limitor), the bus may be of unlimited KVA.



Write for Bulletins 8200 and 8820

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
CLEVELAND 28 • OHIO

8587

For more facts circle 543 on Reply Card

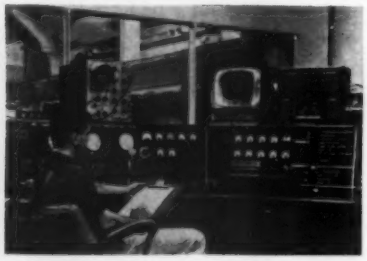
CLOSED-CIRCUIT TV
in action

See how industry is solving tough problems
visually*—with GPL *ii-TV*

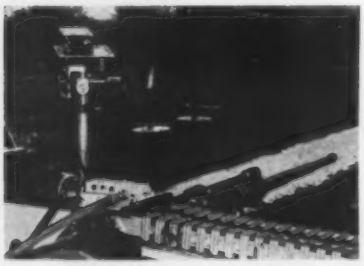
Quick record reference via *ii-TV* permits concentration of records in one area, saves this user $30,000 a year. GPL system is simple enough for anyone to operate.

Hard-to-see actions, as in the bouncing under-chassis of GM cars in road test, *above*, can now be viewed. Standard GPL TV camera takes hard knocks in stride.

Monitoring distant meter saves this manufacturer substantial sums in electric bills by avoiding peak loads. Reliable, remotely located TV camera by GPL needs no tending.



Observer is safe when dangerous operations, like this one involving radiation at Brookhaven National Laboratory, are seen through sharp pictures of GPL camera.



Even bone-shattering concussions can't disturb perfect pictures of GPL's Ruggedized camera, designed specifically for most severe applications.

Basic *ii-TV* system is finest, most dependable; costs less than medium-priced car. Mobile GPL TV Projector gives wall-size pictures 300% brighter than any other.

SEE *ii-TV** FOR YOURSELF

For further details, or demonstration of this precision-engineered system in your own office or plant by local GPL representative, write on your letterhead to Mr. N. M. Marshall, Sales Manager, General Precision Laboratory Incorporated, 61 Bedford Road, Pleasantville, N. Y.

*GPL's *industrial-institutional TV system.*

GPL — A SUBSIDIARY OF GPL

General Precision Laboratory Incorporated

For more facts circle 544 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

loading local and line haul trailers. The drag line will handle 144 carts at the same time.

Medium duty, double ball bearing, Faultless casters were selected for all the carts, using a special six inch diameter rubber-tired wheel. Neoprene seals are used to keep the grease in the bearing and off the floor.

Remove Iron Fines from Syrup

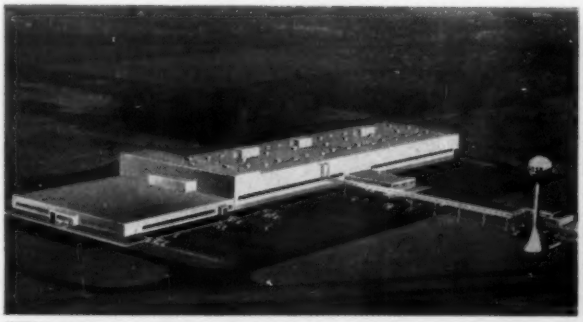
REMOVING FINE IRON from marshmallow syrup posed quite a problem at the Cracker Jack Company, Chicago, Ill., until Plant Engineer D. F. Vater installed a Ferrotrap in the sanitary line handling the syrup to take out iron present in the sugar. Maintenance on the gear pump, through which the syrup is passed, has been reduced and savings of several thousand dollars a year are anticipated.

The unit was quickly installed by coupling into the line and no maintenance is expected other than periodic removal of accumulated iron. The Eriez Ferrotrap contains a permanent magnet and because of this it does not require any wires or connections.

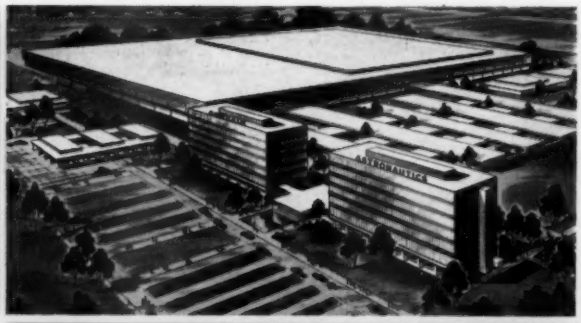
The accumulated iron fines are removed once a week during the regularly scheduled equipment cleaning period. A high pressure spray of hot water rapidly cleans the unit.

Permanent magnet separator is coupled into the syrup line to remove iron fines

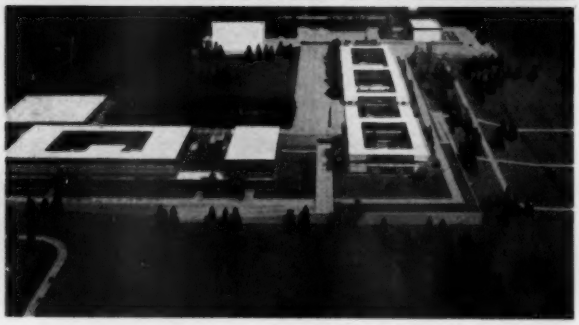
THE CROSS COMPANY—Fraser, Michigan
This automation equipment producer's new plant has two 12-million btu C-E Hot Water Boilers.



CONVAIR-ASTRONAUTICS—San Diego, California
New Convair space-flight research center will have two 30-million btu C-E Hot Water Boilers.



RIVERVIEW COMMUNITY HIGH SCHOOL—Riverview, Mich.
Two 10-million btu C-E Hot Water Boilers heat Riverview's recently expanded high school.



U.S. AIR FORCE ACADEMY—Colorado Springs, Colorado
Choice of five C-E units here typifies widespread Air Force acceptance of high temperature hot water.

HIGH TEMPERATURE WATER

today's new idea in large space heating

In such diverse applications as industrials, large educational institutions, and military bases, high temperature water is finding rapidly increasing acceptance as an ideal means of heating large areas.

A big factor in bringing this trend about is The C-E La Mont Controlled Circulation Hot Water Boiler. Using the same principle as that applied by C-E in many of the country's largest utility boilers, this new boiler provides a degree of temperature control that makes it the most attractive method of heating in many cases. With a wide range of capacities—from 10 to 300 million Btu's—these boilers operate at water pressures up to 500 psi and temperatures to 470F, or higher. A C-E Hot Water Boiler can save from 10 to 20 per cent in maintenance and operating costs.

Combustion Hot Water Boilers in the smaller capacity range are completely assembled in the shop while the intermediate and large units are shipped in varying stages of assembly. This C-E practice greatly reduces erection costs.

So, if you are in the market for boilers, either for space heating or process requirements, it may prove greatly to your advantage to investigate the use of high temperature water as your heat source. Because individual needs vary, both steam and hot water have their place. Our engineers will be pleased to discuss either method with you or your consultants—impartially and with no obligation.

For further details on high temperature water boilers by C-E write for our catalog HCC-2.

COMBUSTION ENGINEERING

Combustion Engineering Building, 200 Madison Avenue, New York 16, N.Y.
CANADA: COMBUSTION ENGINEERING-SUPERHEATER LTD.

C-120-A

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE

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Only New HALLOWELL *ERECTOMATIC.* Steel Shelving

LESS TIME, MORE UNITS PER HOUR, lower costs with Hallowell ERECTOMATIC steel shelving. Maximum adaptability to meet changing conditions, too.

No matter what type of shelving you need—open, closed, bin units, ledge units, counter or cabinets —there's new Hallowell ERECTOMATIC® steel shelving to make your job easy. The unique built-in locking device* speeds assembly and rearrangement of shelving. To position a shelf—just slide it into place on the shelf supports, press the locks, and the shelf is locked. To reposition a shelf—release the locks, pull the shelf straight out, slide it straight in on its supports at the new location, and press the locks. It takes only seconds to do the complete job.

For complete information, see your Hallowell distributor. Or write Hallowell Shop Equipment Division, STANDARD PRESSED STEEL CO., Jenkintown 26, Pa.

*Patent applied for

TWO MEN ASSEMBLED new Hallowell ERECTOMATIC steel shelving in just over 10 minutes. Closed unit was 36 in. wide, 18 in. deep, 7 ft. 3 in. high, complete with seven shelves. Standard models of other design required from 13-55 min. Table shows test results.

Brand	Time to Assemble (Min.)	Units Per Hour
Erectomatic	10.24	5.75
A	13.23	4.53
B	14.24	4.21
C	16.30	3.68
D	18.12	3.31
E	25.03	2.40
F	55.03	1.09

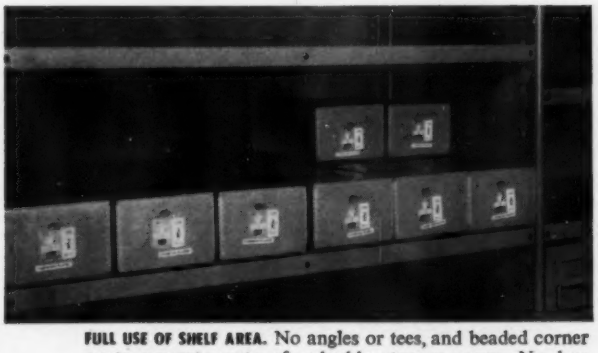
FAST ASSEMBLY. Just position the shelf supports, insert the shelf, and press the unique locking device. No tools or special instructions necessary.

gives you all these extra-value features

QUICK SHELF CHANGE. Just release the locks, remove the shelf and its supports, relocate the shelf, and press the locks. It takes only seconds.

STRAIGHT-IN, STRAIGHT-OUT SHELF CHANGE. No tilting to interfere with any other shelf. No time wasted unloading shelves or removing bin fronts, partial dividers, label holders.

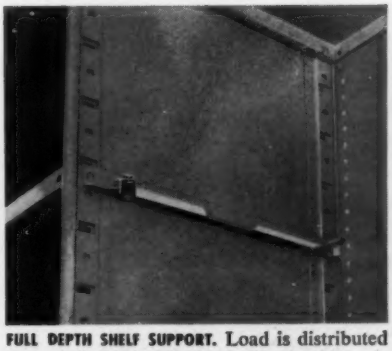
INDEPENDENT SHELF POSITIONING. Each shelf is an independent unit. Can be removed and repositioned without disturbing any other part. All shelves in a rack can be aligned.



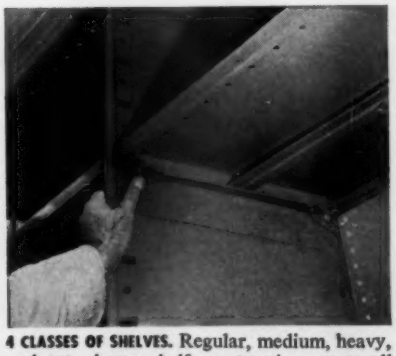
FULL USE OF SHELF AREA. No angles or tees, and beaded corner posts prevent waste of valuable storage space. No box guides are needed.

COMMON SIDE PANELS AND POSTS save assembly time. Also save material between adjacent units in a rack. And both back and side panels are one-piece.

BEADED POSTS AND FLANGED SHELVES prevent snagging of clothing or stored goods. Also prevent injuries from sharp, ragged edges.



FULL DEPTH SHELF SUPPORT. Load is distributed over full depth of shelf. No buckling is possible. Reinforcements can be added when they are required.



4 CLASSES OF SHELVES. Regular, medium, heavy, and extra-heavy shelf construction meets all load requirements. Made to government specifications. Extra-heavy shelf shown.

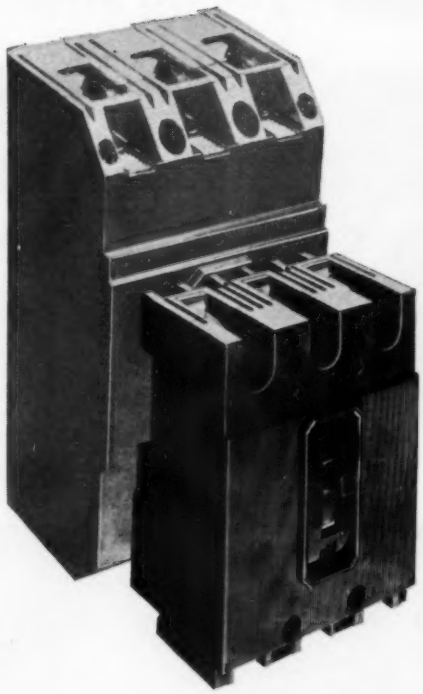
STANDARD PRESSED STEEL CO.

HALLOWELL® SHOP EQUIPMENT DIVISION SPS

JENKINTOWN PENNSYLVANIA

For more facts circle 546 on Reply Card

NEW!



I-T-E ANNOUNCES NEW 100 amp 480 V "EH" FRAME CIRCUIT BREAKER

Reduces mounting space requirement by 40%

Recognizing industry requirements for an intermediate, compact 100 amp frame 480 v breaker, I-T-E engineers have designed a new "EH" frame molded case circuit breaker which requires 40% less mounting space than breakers previously employed to meet the rating capacity.

The new "EH" frame breaker is ideal where intermediate voltage and interrupting ratings must be handled, and space is at a premium. Specify the I-T-E "EH" frame and benefit from the compact design advantages which this new circuit breaker provides.

Contact your local I-T-E sales office or write I-T-E Circuit Breaker Company.

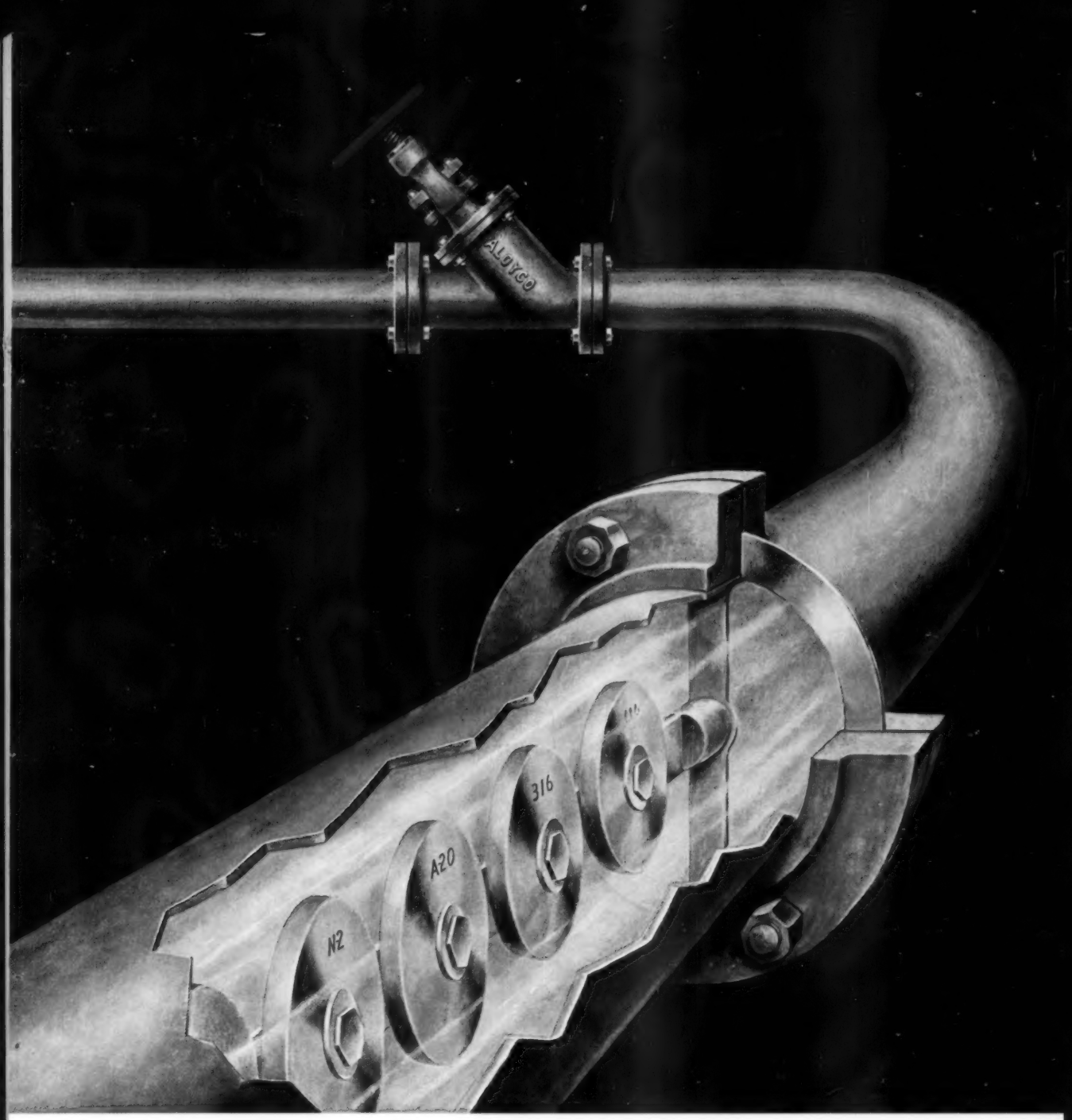
SMALL AIR CIRCUIT BREAKER DIVISION

I-T-E CIRCUIT BREAKER COMPANY

19TH AND HAMILTON STREETS, PHILADELPHIA 30, PENNSYLVANIA

For more facts circle 547 on Reply Card

For more facts circle 548 on Reply Card ——→



Inside look at Aloyco Corrosion Engineering Service

This is a realistic illustration of an Aloyco line test—as it might be conducted in your plant as a regular part of Aloyco Corrosion Engineering Service.

Whenever there is no 'book solution' to a specific valve problem, we will prepare a test rack carrying a series of alloy specimens (discs above) to be inserted in your process line. Purpose is to pinpoint the alloy that will most efficiently stand up to the specific corrosives under your actual line conditions.

Our sole purpose with the Aloyco Corrosion Engineering Service is to help you successfully solve corrosives-handling problems. Our resources are the metallurgical experience, foundry skills and engineering know-how we have gained in twenty-seven years as the world's largest specialist in Stainless Steel Valves.

Bring your corrosion problem to Alloy Steel Products Company, 1301 West Elizabeth Avenue, Linden, New Jersey. 7.2

ALLOY STEEL PRODUCTS COMPANY

DECIDEDLY BETTER
DAY-BRITE
Lighting Fixtures

HERE . . . MEANS BETTER SEEING HERE

Day Brite CFI-10 fixtures light the way to "micro-perfect" accuracy in Lambert Engineering Company's new St. Louis plant. CFI means "Comfort For Industry." Day-Brite offers a complete line of CFI fixtures for every industrial application.

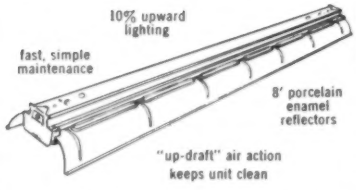
What ever became of shadows?

If fast, precision work is your business, you *know* the importance of easy seeing, the danger of shadows and glare. Don't compromise on lighting! Always insist on Day-Brite—the nation's first choice in lighting fixtures. For proof of Day-Brite superiority, make *your own* critical comparison.

Ask your Day-Brite representative for a demonstration, today! He's listed in the Yellow Pages.

Day-Brite Lighting, Inc., 5439 Bulwer Ave., St. Louis 7, Missouri.
Day-Brite Lighting, Inc., of California, 530 Martin Ave., Santa Clara, California.

71189



THE DAY-BRITE CFI-10 is engineered for a *lifetime* of service. Rapid-Start, Slimline and High-Output Rapid-Start lamps. Available in 2 or 3 lamp units. All-steel reinforced construction.

NATION'S LARGEST MANUFACTURER OF COMMERCIAL DECIDEDLY BETTER DAY-BRITE *Lighting Fixtures* **AND INDUSTRIAL LIGHTING EQUIPMENT**

For more facts circle 549 on Reply Card

Now . . . a New High in Dust Filter Efficiency . . .

New SLY "ROLL-CLEAN" Dynaclone

Patent No. 2583039
Patent No. 2695681
Other Patents Pending

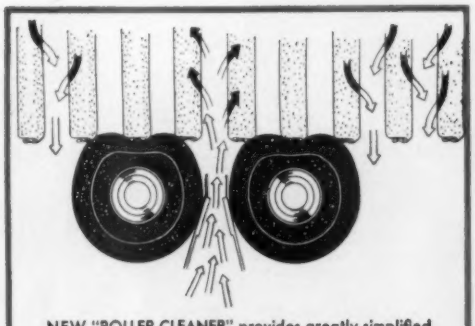
THESE NEW FIELD-PROVEN FEATURES

- Easier filter bag changing.
- Greater cloth area.
- Fewer operating parts.
- Free-rolling cleaner — no sliding.
- Complete dust seal — automatic seal adjustment.
- Easy access to all dust filter parts for inspection and servicing.

PLUS THESE TIME-TESTED DYNACLONE ADVANTAGES

- Constant suction at dust sources — complete dust collection.
- Self-cleaning for continuous operation.
- No auxiliary motors or blowers required for filter-bag cleaning.
- Greater filtering capacity and smaller space requirements — more cloth per cubic foot of filter than any other make.
- Lower power requirements.

The original self-cleaning dust filter, the Dynaclone has proven itself the most efficient dust filter ever made. The "Roll-Clean" Dynaclone combines design simplicity and rugged construction to insure even greater operating efficiency . . . even longer trouble-free service.



NEW "ROLLER CLEANER" provides greatly simplified method of cleaning dust from filter bags. Resilient rubber rolls automatically adjust to form a positive dust seal as each row of bags is cleaned by atmospheric air.

NEW CATALOG

. . . gives full details on "Roll-Clean" Dynaclone and other Sly Dust Filters . . . contains valuable engineering information. Write for your copy.

See it in Space 73, the Chemical Show, New York Coliseum, Dec. 2-6.

SINCE 1876 SLY

THE W. W. SLY MANUFACTURING CO.

4600 TRAIN AVENUE • CLEVELAND 1, OHIO
OFFICES IN PRINCIPAL CITIES

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This plant took to the air to get

ANACONDA 3/c 500 Mcm 5kv shielded Aerial Cable being pulled at large midwest plant. Cable was installed on steel towers leading from substation to plant facilities.

new power fast —at low cost

Installed Anaconda 5kv Aerial Cable

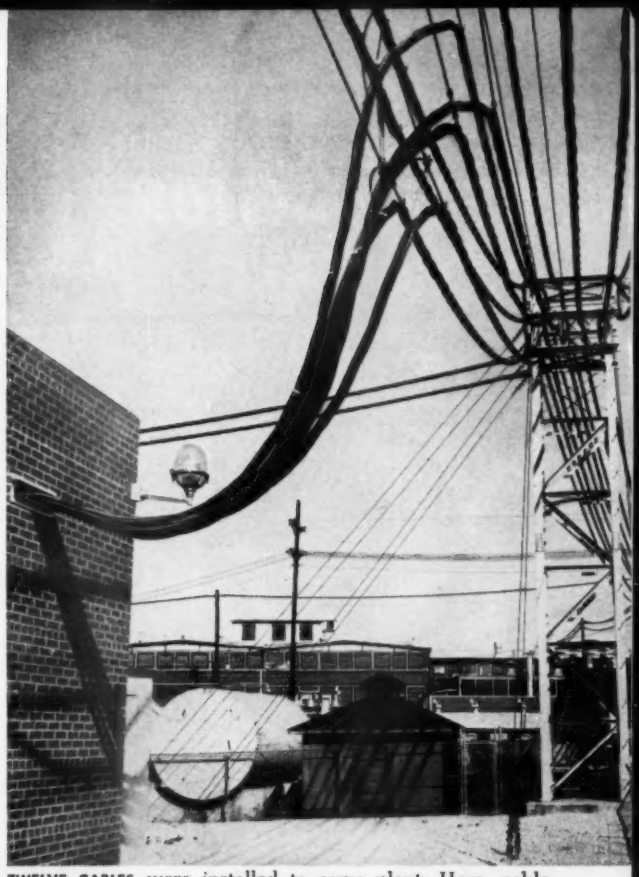
First, this major manufacturer looked at original costs. Then upkeep. And like so many others today, decided on Anaconda Aerial Cable for their new high-voltage distribution system.

Look how it paid off! Easy splicing, tapping and terminating simplified installation . . . reduced time and labor. There was no ditch to dig or fill. No underground pipes or structures to dodge. And no ducts, crossarms or insulators were needed. Their aerial cable is always handy for maintenance. And it's safe, neat.

Finest Aerial Cable. Anaconda Aerial Cable is made with tough neoprene jacket that offers highest resistance to weather, corrosive atmosphere, sun. Special Anaconda Type AB butyl insulation gives extra protection against ozone, heat and moisture.

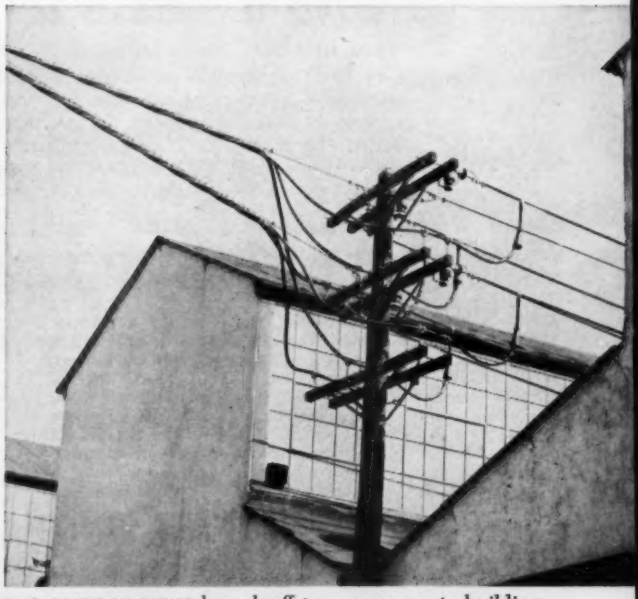
For the full story on aerial cable, call the Man from Anaconda or your nearest Anaconda distributor. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

57339



TWELVE CABLES were installed to serve plant. Here, cable drops off messenger to substation entrance.

INSIDE THE SUBSTATION, cables are laid in overhead aluminum racks, then terminated in switch gear.



TWO OF THE 12 CABLES branch off to serve separate building. Aerial cable is terminated at pole structure.

See the man from ANACONDA®

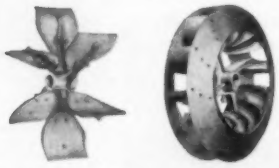
for AERIAL CABLE

For more facts circle 551 on Reply Card

FAST ACTION DELIVERY

Clarage Industrial Air and Material Handling Fans

TYPE XL FANS. Distinguished by advanced design, high efficiency. Universal discharge, 3 different interchangeable wheel types available, reversible for either clockwise or counter-clockwise rotation with rim or open type wheels. Rugged, tight, fabricated steel construction. Pressures to 18" SP. **IMMEDIATE SHIPMENT** on all standard Arrangement 1 and 9 fans. Arrangement 4 and 8 fans also promptly available.



TYPE CI FANS. Proved performers in a wide range of services. Cast iron construction. Universal discharge, 2 different interchangeable wheel types available, reversible for either clockwise or counter-clockwise rotation. 6 sizes, pressures to 24" SP. **IMMEDIATE SHIPMENT** on all standard Arrangement 1 and 2 fans. Arrangement 4 and 8 fans also promptly available.

CALL TODAY the nearest Clarage sales engineering office:

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CINCINNATI, OHIO
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CORPUS CHRISTI, TEXAS
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CLARAGE FAN COMPANY Kalamazoo, Mich.

CLARAGE

...dependable equipment for making air your servant

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

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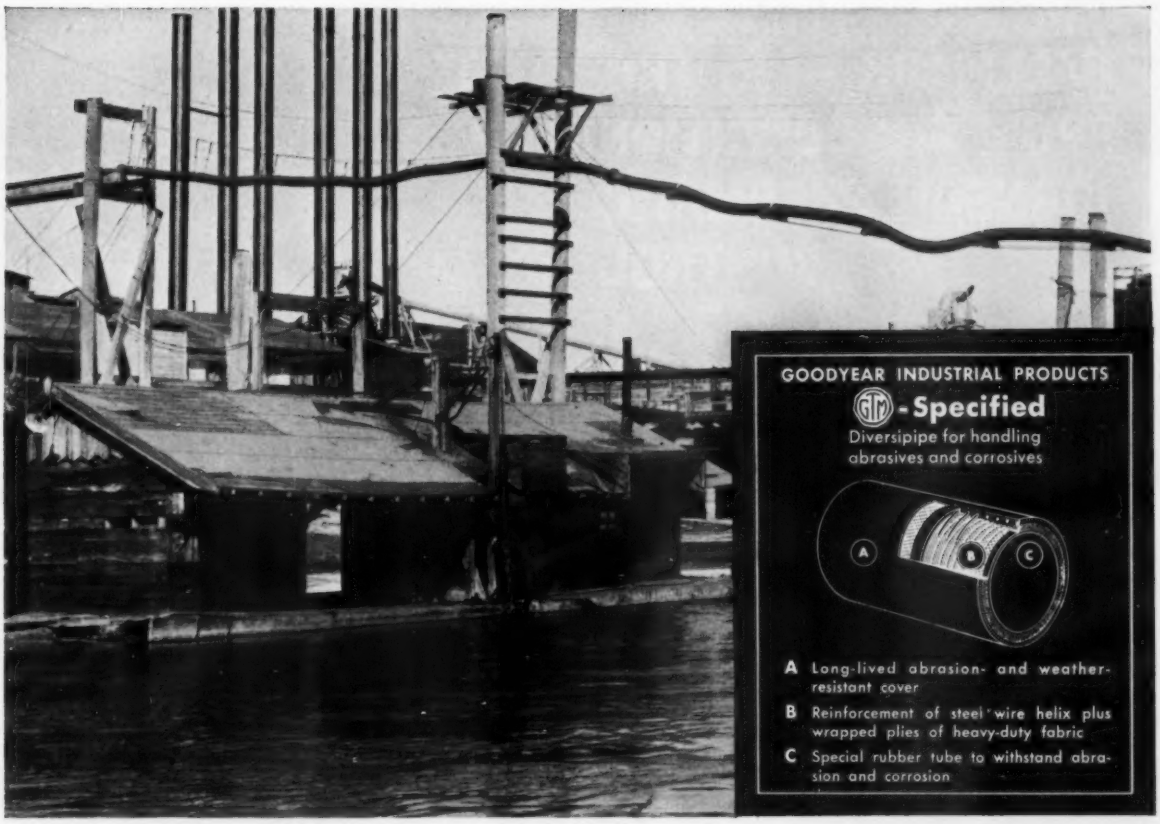
GOODYEAR INDUSTRIAL PRODUCTS
G.T.M.-Specified
Diversipipe for handling abrasives and corrosives
A
B
C
A Long-lived abrasion- and weather-resistant cover
B Reinforcement of steel wire helix plus wrapped plies of heavy-duty fabric
C Special rubber tube to withstand abrasion and corrosion

New way to dispose of disposal problems

DISPOSAL OF corrosive bleach liquor posed a real problem at this Northwestern paper mill. One suggestion was to release it along the bottom of the adjoining river–distributing it widely enough to halt the fouling of fishermen's nets and threatened pollution of the water. But not even the strongest steel pipe could stand up under the corrosive flow–or the buffeting of river currents.

Then someone thought of hose–and of consulting the G.T.M.–Goodyear Technical Man. His recommendation: Diversipipe–rugged corrosion- and abrasion-resistant rubber pipe–joined at wide intervals by stainless steel couplings. Vented through these couplings, the troublesome liquor would be thoroughly dispersed. Result: this *Diversipipe installation has kept the river clean for 3½ years–promises years more service.*

Here, then, is a unique, low-cost means of waste disposal – adaptable to many situations. It's another example of the way the G.T.M. can be of invaluable help–wherever industrial rubber products are involved. And he's always quickly available through your Goodyear Distributor–or by writing Goodyear, Industrial Products Division, Akron 16, Ohio.

DIVERSIPIPE by

GOODYEAR

THE GREATEST NAME IN RUBBER

IT'S SMART TO DO BUSINESS *with your Goodyear Distributor. He can give you fast, dependable service on Hose, V-Belts, Flat Belts and many other industrial rubber and nonrubber supplies. Look for him in the Yellow Pages under "Rubber Goods" or "Rubber Products."*

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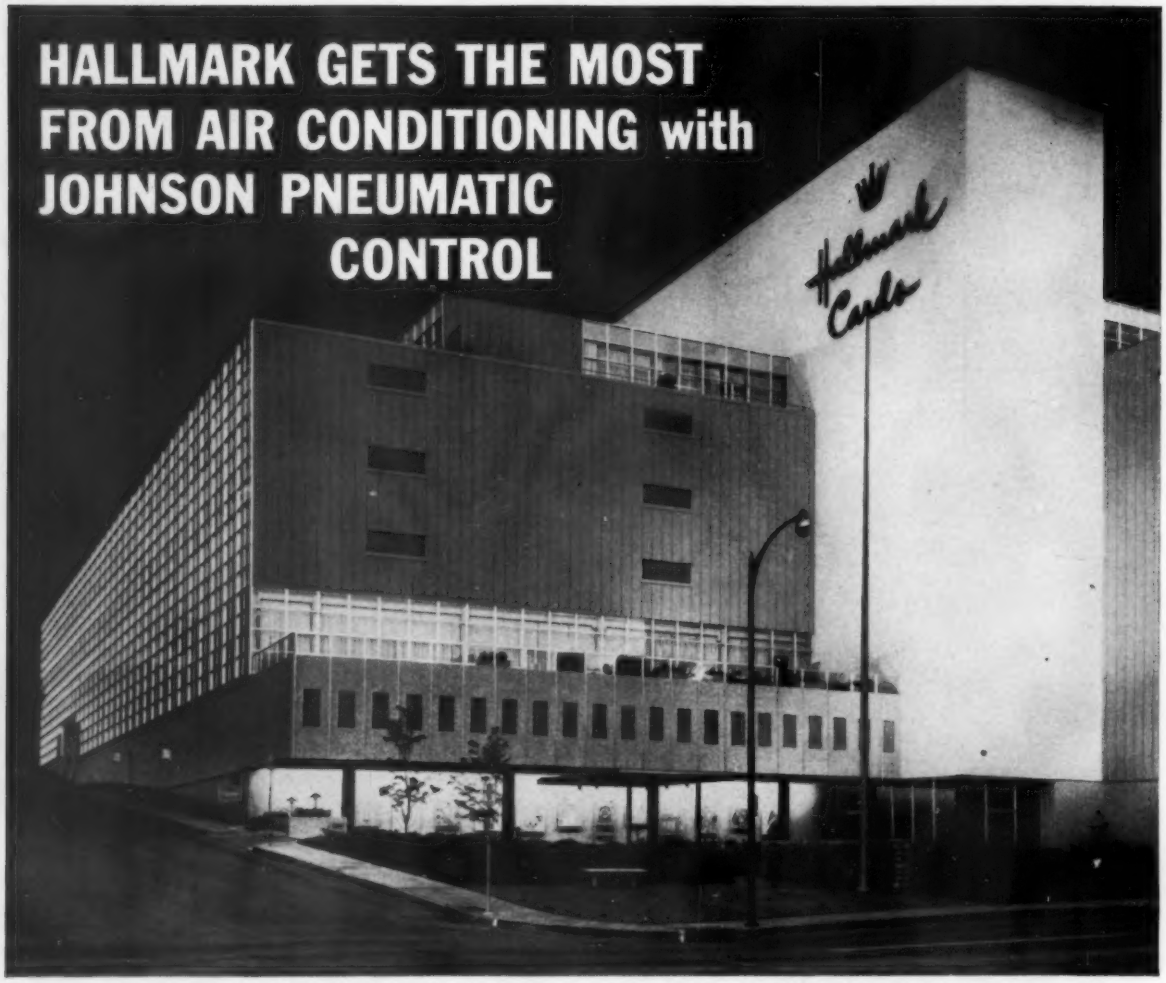


Hallmark Cards, Inc., Kansas City, Missouri. Welton Becket & Associates, architects and engineers; Long Construction Co., general contractor; Interstate Heating & Plumbing Co., mechanical contractors; all of Kansas City.

Multi-Purpose Pneumatic Control System Helps Solve Diversified Production Problems, Insures Made-To-Order Working Climate

Precision regulation of temperatures and humidities makes important contributions to production efficiency in the new air conditioned home of Hallmark Cards. The "brainwork" for the air conditioning system is done by a Johnson Pneumatic Control System that matches temperature and humidity conditions to the exact needs of the work carried on in each room and area of the 760,000 sq. ft. building.

Effective control has simplified numerous problems of handling temperature- and humidity-sensitive paper stock and helps make possible consistent, high speed, quality production of famous Hallmark greeting cards.

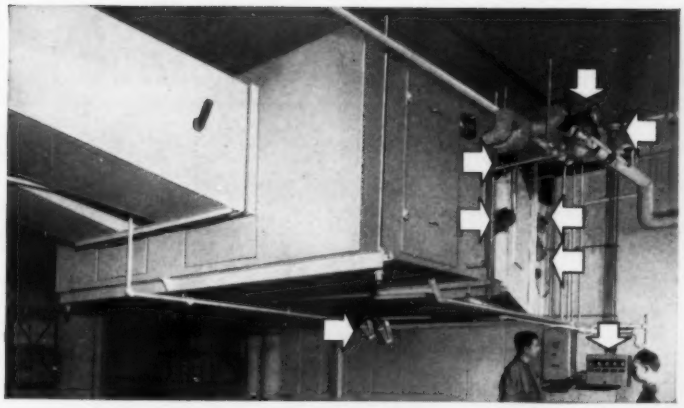
Equally important is the provision of an ideally controlled environment for Hallmark's creative staff and office employees.

Proper control of industrial air conditioning, heating and ventilating systems is becoming increasingly important as a means of improving production, cutting costs and adding to worker efficiency. The specialist Johnson organization will welcome the opportunity to work with you, your staff engineer or consulting engineer in applying these advantages to your operations. Johnson Service Company, Milwaukee 1, Wisconsin. Direct Branch Offices in Principal Cities.

JOHNSON CONTROL

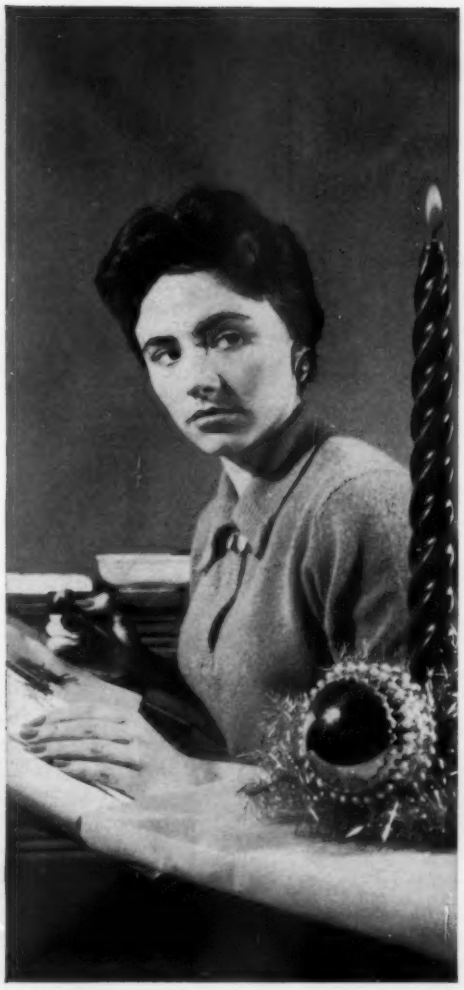
PNEUMATIC SYSTEMS

PLANNING • MANUFACTURING • INSTALLING • SINCE 1885



Conditioned air is supplied by 45 single-zone and 10 multi-zone units. Johnson equipment is shown above controlling outdoor air and return air dampers and hot and chilled water supplies on a typical production area unit. Space conditions are controlled by Room Thermostats and Room Humidostats.

Fast response to load shifts is a must in the 600-seat cafeteria. Sensitive Johnson Thermostats and Humidostats quickly compensate for changes in occupancy, hold temperature and humidity at ideal comfort levels. Stage and projection equipment permit the dining area to be used also for company functions.



Refreshing, perfectly regulated temperatures add to the efficiency of Hallmark's all-important creative staff. Many companies report that properly controlled air conditioning not only improves worker performance but helps reduce absenteeism and turnover and makes recruiting easier.

YOU CAN DO IT BETTER with JOHNSON PNEUMATIC CONTROL

1. Greater Simplicity—pneumatic control involves far fewer and much simpler components than anything else you can use.

2. Ease of Operation—inexpensive control pressure gauges, exclusive with pneumatic systems, give you unlimited freedom to observe and direct system operation.

3. Choice of Features—widest choice of operating features to match your needs. Johnson makes the most complete line of pneumatic temperature, humidity and pressure control equipment.

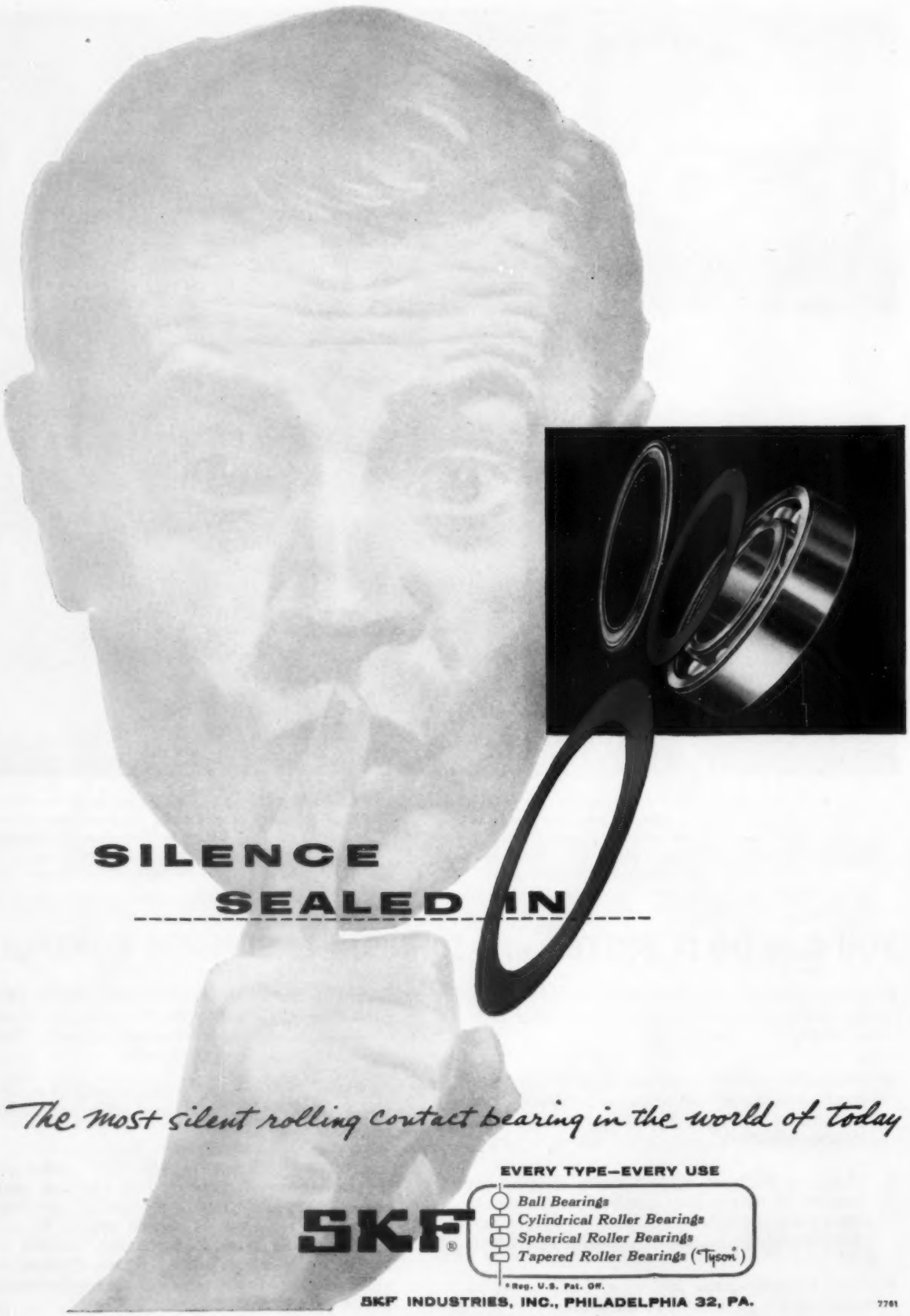
4. Less Upkeep—there are fewer components to check, fewer parts subject to failure.

5. Reliable Performance—Johnson Pneumatic Control is unaffected by short circuits, electrical overloads, voltage variations and humidity. You get continuous, accurate control.

6. Complete Safety—even in the presence of explosive gases, solvents, dusts and other hazardous materials.

7. Maximum Flexibility—a big "plus" value in industrial work. No matter how exacting your needs, Johnson Pneumatic Control can produce the results required. It can be applied to any type or make of air conditioning, heating or ventilating system. Each Johnson System is engineered and installed to suit the requirements of the individual installation.

For more facts circle 554 on Reply Card



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SEALED IN

The most silent rolling contact bearing in the world of today

EVERY TYPE—EVERY USE

SKF®

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- *Cylindrical Roller Bearings*
- *Spherical Roller Bearings*
- *Tapered Roller Bearings ("Tyson")*

® Reg. U.S. Pat. Off.

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

7761

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COURT DECISIONS —a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Misuse of Patent

In a suit in Wisconsin for the recovery of royalty payments claimed to be due under patent licensing agreements, one among other features of the defense of the licensee was that this royalty contract was illegal as an attempt to use these patents to stifle competition and unlawfully extend the patent monopoly.

In its refusal to sustain this defense, the court outlined the doctrine known as the "Doctrine of the Misuse of Patents," under which the patentee frequently forfeits the monopoly bestowed upon him by the patent law.

"The basic principles of this doctrine," according to that court, "are that public interest is the dominant consideration. This doctrine denies to the patentee the power to use his patent in such a way as to acquire a monopoly which is not plainly within the terms of the grant. While the patentee has the power to refuse a license that does not enable him to enlarge the monopoly by attaching conditions to its use.

"The doctrine of misuse of patents," said the court in conclusion, "involves public policy. It involves more than the contracting parties. It is for the protection of the public. The rule seems to be that he who asserts it 'must have clean hands.' It is based on the use of the patent for the purpose of unlawfully extending the monopoly." Court brief 150 F. S. 384, March 14, 1957.

Union Organization

Agent of a local union called on a plant owner at Massapequa, New York, seeking to organize the employees. Asked by the employer if he had authorization cards, the agent replied he had six, although only five had been signed, and that these employees wanted an employment agreement requiring membership in the union as a condition of employment.

During the following week, the employer discussed the grievances with these six employees and in the course of the discussion offered them wage increases if they would reject this project of organizing a union. This the men refused to do, and returned to the agent of the union, received strike placards and set up a picket line.

Charges of unfair labor practices were made against this employer to the N.L.R.B. by the union. That Board held that the employer had violated the National Labor Relations Act by discriminating against employees on the basis of union membership and by discouraging membership in a labor organization, and ordered the employer to cease and desist from interfering with its employees in the exercise of their rights, and to offer reinstatement with back pay to the strikers.

In ordering the enforcement of the ruling of the Board, the Federal appellate court said, of the defense of the employer that the demand of the union for a closed shop was illegal, that assuming that the union was demanding an illegal security clause, that such a demand was a matter to be resolved in the bargaining process and not an excuse for refusing to bargain at all. Court brief 241 Fed. 2d 620, Feb. 18, 1957.

Patent Pooling

Defense in a suit charging patent infringement claimed that the patent owner had "block-booked" its patents, and that such action was a violation of the antitrust laws.

Block-booking, in a definition by the Supreme Court of the United States, is the practice of licensing or offering for license one patent on the condition that licenses of additional patents will be made to and accepted by the licensee. Here the patent owner had pooled approximately 600 telephone and radio patents. These patents it licensed in their entirety to producers in return for the payment of royalties of an agreed percentage of the gross sales of the licensee.

When the appeal by the infringer of this patent from a decision against it was decided by the Federal Court, it was said of this method of pooling patents,

"This royalty provision does not create any monopoly. It creates no restraint of competition beyond the legitimate grant of the patent. The right to a patent includes the right to market the use of the patent at a reasonable return. The mere accumulation of patents, no matter how many, is not in and of itself illegal. We cannot say that payment of royalties according to an agreed percentage of the licensee's sales is unreasonable.

"Sound business judgment would indicate that such payment represents the most convenient method of fixing the business value of the privileges granted by the licensing agreement." Court brief 227 Fed. 2d 137, October 31, 1955.

Abandoned Invention

On the top of a building in Camden, New Jersey a radar apparatus to sight near-at-hand objects and vessels on the Delaware River was installed in 1937. In the operation of the instrument it was found that while it located buildings, smokestacks and other objects, it was entirely lacking in accuracy. Smokestacks were indicated well out in the middle of the Delaware River and vessels, by the radar, were navigating over the adjacent land. No further effort was made at perfecting the apparatus and it was dismantled.

In the fall of the following year an application was filed for a patent on this discovery by the assignee of a French patent. Eight days later a patent application for this same discovery was filed by another party.

In its decision holding the second party not entitled to this patent over the application of the other inventor, the Federal court said of the fatal effect of the abandonment of this radar experiment and the delay in the filling of the application for the patent,

"The claimed invention was talked about as something to use on ships and large airplanes. Despite the obvious differences in the conditions

COURT DECISIONS

on top of an office building and that on a moving ship at sea or in an airplane there was no experimentation done in either place. There was considerable delay in filing the application for the patent. This is explained by the fact that there were many applications in this general field and they could not all be made simultaneously. Nevertheless the delay existed." Court brief 232 Fed. 2d 727, April 19, 1956.

Escalation Clause Valid

CONTRACT FOR STEEL for the construction of a building in New York City, made by a steel company with the general contractor, contained an escalation clause, that in the event the prices for component materials increased or decreased there would be a corresponding adjustment of the contract prices, with such adjustment limited to $15 per ton.

With an increase of $10 a ton made under this provision, the bills aggregated $94,861.15, which the contractor refused to pay. In its defense of the suit brought for the recovery of this amount, it was argued by the general contractor that this clause permitting this increase gave the steel company the arbitrary power to change the contract price terms as it wished.

In affirming a judgment in favor of the steel company, in which this contract was sustained, the New York Court of Appeals said, "This escalation clause provided for increases or decreases in accordance with changes in the steel company's regular prices to all purchasers of plain steel products and such a provision does not give the company undue power of determination of the contract price." Court brief 2 N.Y. 2d 456, March 8, 1957.

Liability for Metal Fatigue

ON A NEW YORK CITY construction job a toggle bolt, connecting the ends of a brakeband of a hoist, broke. With the release of the brakeband the hoist dropped from the fourth floor, injuring an employee.

Breaking of this toggle bolt was caused by metal fatigue, brittleness from repeated bending. Although the equipment had been inspected prior to its use on this work the fatigue fracture would be disclosed only by certain metallurgical tests.

In its decision of the suit brought by this employee, the court said of the liability of the owner of the hoist, "The fact that such defects are latent should not excuse the supplier if the jury found that under all the circumstances a standard of care would have dictated that a duty existed to make inspection for the purpose of uncovering such latent defects.

"The law is now clear that a supplier may be liable for injuries resulting from discoverable defects. The latency of the defect is immaterial if under the circumstances there was a duty to test or go beyond the visual inspection which would have resulted in discovering the defect." Court brief 122 N.Y.S. 2nd 236, June 19, 1953.

Illegal Cross Licensing

Stock of an Ohio corporation, was equally divided between five manufacturers of milling, grinding and automatic screw machines and other types of machine tools.

To this corporation these stockholders, had, in turn, transferred their patents and the corporation had licensed the use of the patents under a "Declaration of uses" agreement. In that agreement it was provided that these patents were to be exclusively licensed to each corporation for a specified use which should be exclusive and non-competitive.

Action was brought by the United States to prevent the execution of this plan. The court pointed out, "The very purpose of the plan was to suppress competition between the parties by confining the use of these patents to non-competitive fields of activity.

The court added, "The parties were restricted in their manufacture of machine tools by being unable to obtain licenses permitting them to incorporate features covered by the subject matter patents or improvements on machine tools not included in their respective fields.

"Invention and technological development have been discouraged by the limitations imposed on the members' rights to use and license improvement patents developed by them. By their continued adherence to this agreement," concluded the court, "these stockholders have engaged in a continuing conspiracy to unreasonably restrain interstate commerce in the manufacture of machine tools in violation of the Sherman Act." Court brief 134 F. S. 74, June 20, 1955.

Legal Lockout

CHARGES OF unfair labor practices against a multi-employer bargaining association were filed by a union with the National Labor Relations Board. For approximately 14 years this association of eight small employers had negotiated collective bargaining agreements with the union.

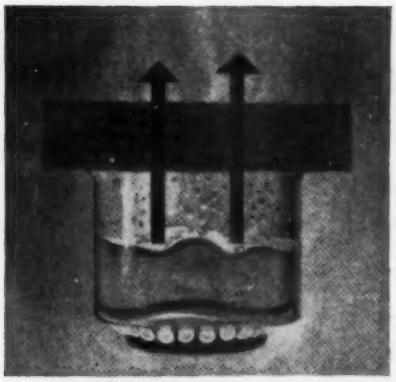
During the negotiations for a change in the employment agreement, the union put into effect a "whip-sawing" plan, striking and picketing the plants of these members one at a time.

In retaliation the other members of the association discharged the employee members of the union with a notice to the union that they would reinstate these workers when the strikes were ended. The charge came before the United States Supreme Court.

In sustaining the right of these employers to lay off their union employees, that court said, "Although the labor statute protects the right of employees, that protection is not so absolute as to deny self help by employers when legitimate interests of employees and employers collide.

"The ultimate problem," added the court, "is the balancing of the conflicting legitimate interests. The function of striking that balance to effectuate national labor policy is often a difficult and delicate responsibility which the Congress committed primarily to the National Labor Relations Board, subject to limited judicial review.

"We hold that in the circumstances of this case: 'the Board correctly balanced the conflicting interests in deciding that a temporary lockout to preserve the multi-employer bargaining basis from the disintegration threatened by the Union's strike, was lawful'." Court brief 77 S. Ct. 643, April 1, 1957.



Some insulations transmit vapor

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INSULATION

is vapor-proof...

needs no separate vapor barrier!

—and inorganic FOAMGLAS is dimensionally stable . . . waterproof . . . easily carries loads of 7 tons per sq. ft. . . . can't burn . . . repels all vermin . . . easy, economical to handle and install. Write for detailed literature.

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ACCO for Better Values

SPEEDY SLING SERVICE with ENGINEERED SAFETY!

ACCOLOY® KUPLEX SLING CHAINS

Quick Service from Distributor's Stock!

• Your nearby ACCO Authorized Sling Chain Distributor now offers a new sling service that saves time and money for you. This is made possible by American Chain's sensational, newly-designed ACCOLOY KUPLEX **Sling Chains.**

SAFE, STRONG, STREAMLINED

These slings are the *latest and greatest development* in sling chains. All parts in each leg are manufactured *exclusively* by American Chain, of the same alloy, and engineered to be as strong as the chain itself. They are of a streamlined design that reduces the possibility of catching or snagging.

Finally the component parts are factory proof-tested to twice the working load limits—your assurance of maximum strength and safety.

Another valuable feature: all parts remain visible for easy, periodic wear inspection.

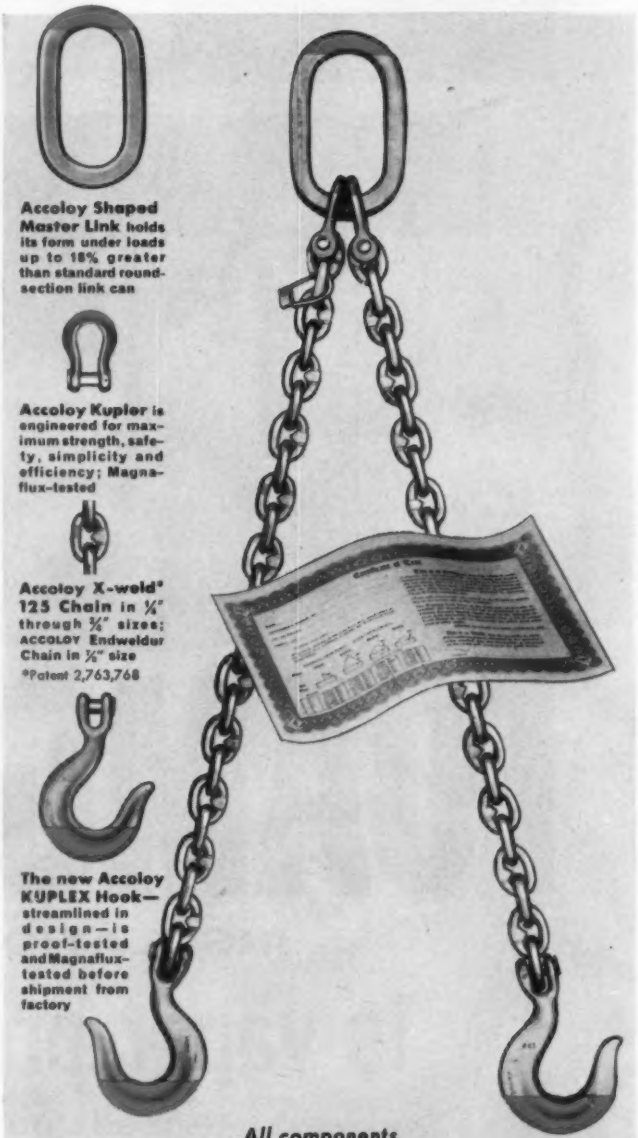
TWO STYLES—SIX SIZES

The new ACCOLOY KUPLEX Sling Chains are available in single-leg and two-leg styles and in six chain sizes, from ¼" through ⅞". All chain is made of Accoloy 125 material. All component parts of each assembly are marked and easily identified as to the size of chain with which they are to be used. Components are *color-marked in* orange for easy identification.

CERTIFICATE OF TEST, issued by ACCO and signed by your Authorized Distributor, is furnished with each sling shipment.

GET THE COMPLETE STORY

You will find it to your advantage to learn the full story of ACCOLOY KUPLEX Sling Chains—how easy they are to assemble and disassemble . . . how promptly and easily they can be serviced . . . and how you can benefit from this Great New Distributor Service and this Great New Sling Chain. Write for **Folder DH-54** and name of nearest ACCO Authorized Sling Chain Distributor.



Accoloy Shaped Master Link holds its form under loads up to 18% greater than standard round-section link can

Accoloy Kuplor is engineered for maximum strength, safety, simplicity and efficiency; Magnaflux-tested

Accoloy X-weld* **125 Chain** in ¼" through ⅝" sizes; ACCOLOY Endweldur Chain in ⅞" size

*Patent 2,763,768

The new Accoloy KUPLEX Hook—streamlined in design—is proof-tested and Magnaflux-tested before shipment from factory

All components
PROOF-TESTED and COLOR-MARKED for easy identification

American Chain Division
AMERICAN CHAIN & CABLE
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ACCO

Sales Offices: *Atlanta, Boston, *Chicago, *Denver, Detroit, *Houston, *Los Angeles, New York, Philadelphia, Pittsburgh, *Portland, Ore., *San Francisco

Indicates Warehouse Stocks

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WRIGHT HOISTS & CRANES

FOR LONGER LIFE • EASIER MAINTENANCE
LOWEST FINAL COST

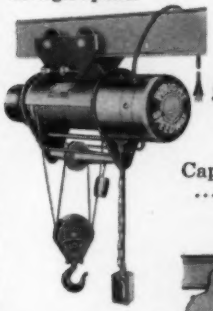
ACCO

WRIGHT *SPEEDWAYS*

Available with single, 2-speed or variable speeds and with a wide variety of mounting arrangements

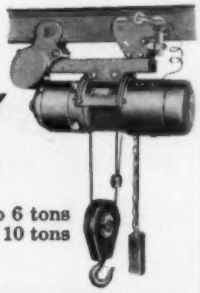
2-SPEED *SPEEDWAY* FRAME 1

Capacity ¼-ton to 1 ton. Two-speed, 1800/450 RPM motors permit precise, gentle positioning of work at slow speed... fast lifting and lowering at high speed.



***SPEEDWAY* FRAME 1½**

4-part reeved. Capacity to 2 tons ...relatively slow lifting speeds.



***SPEEDWAY* FRAME 2 FRAME 3**

Capacities—
Frame 2, ½-ton to 6 tons
Frame 3, 4 tons to 10 tons

NEW WRIGHT ELECTRIC CHAIN HOOKS

LIGHT—COMPACT—RUGGED—LOW COST

Two capacity ranges as pictured. Single Chain—300 to 2000 lbs. Double Chain—3000 to 4000 lbs.

Long Life—Safety—Minimum Maintenance are assured by—

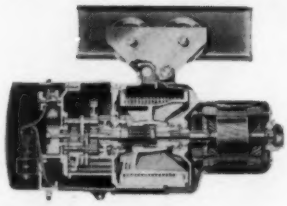
Alloy Steel Load Chain wick-oiled for longest life...heat-treated for long-wearing surface and ductile shock-resistant core—**Load Wheel, Hooks** and **Hook Couplings** drop-forged alloy steel—**Precision Ball Bearings** and **Gears** operate in oil bath—**Double Braking—Fewest Moving Parts.**

These Features make WRIGHT *SPEEDWAYS*

Capacities ¼-ton to 10 tons

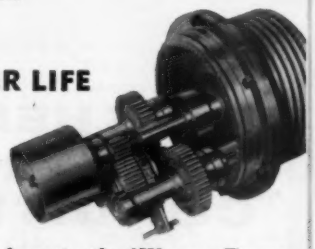
your best buy for—

MORE PRODUCTION



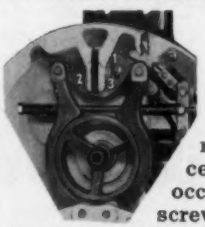
Fine balance and heavy-duty design make possible the continuous handling of tough jobs on any duty cycle for which a 30 minute NEMA motor is satisfactory. All gears and pinions are alloy steel, heat-treated. Their ductile core is shock resistant to severe service stresses. Anti-friction bearings throughout.

LONGER LIFE



Strength of gear teeth of WRIGHT Frame 2 and Frame 3 *Speedway* Hoists has been doubled by a change in contour and grain structure of the metal. Internal gear ring with heavy flange cross section is bolted to drum at six points and provides extreme resistance to distortion.

EASIER MAINTENANCE



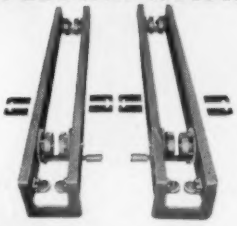
There is "*Nothing to Adjust but the Cam*" to keep the motor brake in perfect adjustment. When excessive load drift occurs...remove the screw shown at Position **1**, swing the cam until Position **2** is in line and replace the screw. Position **3** is provided for the final one-third of brake lining wear. Brake springs and solenoid never need adjustment!

Build Better Cranes Save Money too! with WRIGHT

END TRUCKS

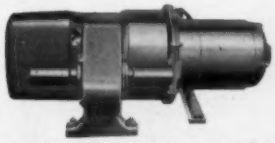
CRANE DRIVE UNITS

***SPEEDWAY* HOISTS**



WRIGHT END TRUCKS

For motor-driven cranes—both top-running and under-hung types. Timken Bearings throughout. Wide range of capacities up to 10 tons. Structural steel construction is lighter and stronger than cast frames.



WRIGHT CRANE DRIVE UNIT

For crane and double-beam trolley propulsion. Electric motor transmits power through fluid drive to well-proportioned gear reduction. Units are equipped with WRIGHT-designed solenoid "drag" brake. Size 1 Drive Unit has motors up to 2 HP...Size 2 has motors 3 HP to 7½ HP.

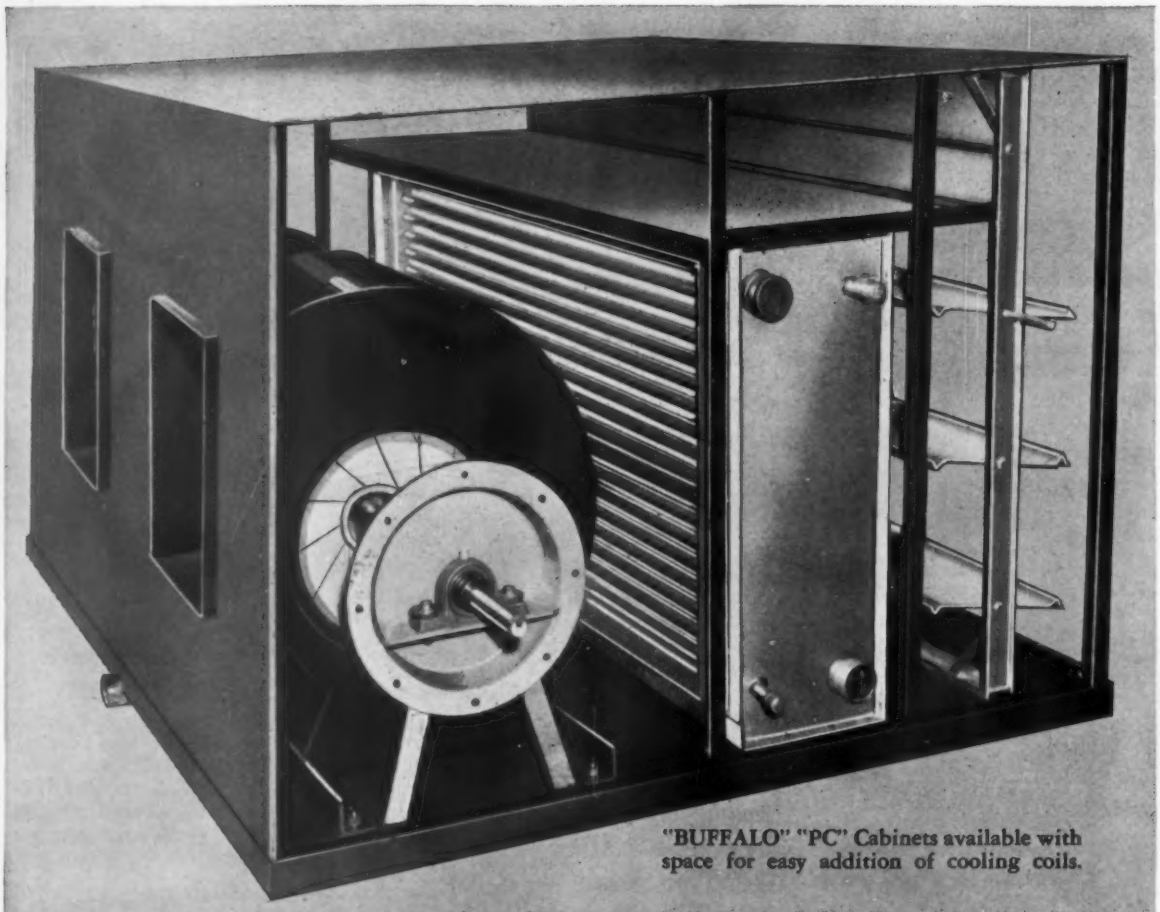
For Complete Information

Write for these Booklets—

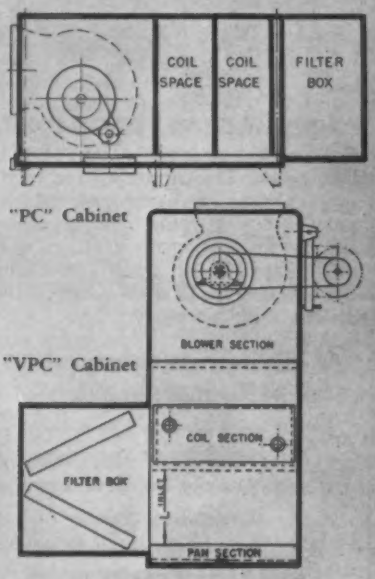
DH-73 • New Electric Chain Hoist
DH133B • Frame 1 *Speedways*
E58 • Frame 2 & 3 *Speedways*
Motor Driven Cranes
227 • Underhung, Single Bridge
DH448 & DH449 • Top-Running
DH431A • Crane Drive Units

Wright Hoist Division
AMERICAN CHAIN & CABLE

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.



"BUFFALO" "PC" Cabinets available with space for easy addition of cooling coils.



HAVE HEATING COMFORT NOW...ROOM FOR AIR CONDITIONING LATER

Actually, "Buffalo" "PC" Cabinets are known to industry principally as highly efficient central *air conditioning units.* However, they can be supplied economically as equally efficient *space heaters* — with space in the coil section for future installation of cooling coils.

Thus, whether you want heating and ventilation only — or if you plan to "grow into" air conditioning later on, "PC" Cabinets are your answer either way. There's a horizontal or vertical model to fit your installation, in 875 to 22,000 CFM capacities. Contact the Buffalo Forge Representative nearest you or write the "Buffalo" Engineering Department today for the best solution to your problem of plant comfort with these adaptable and effective units.

BUFFALO FORGE COMPANY

Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

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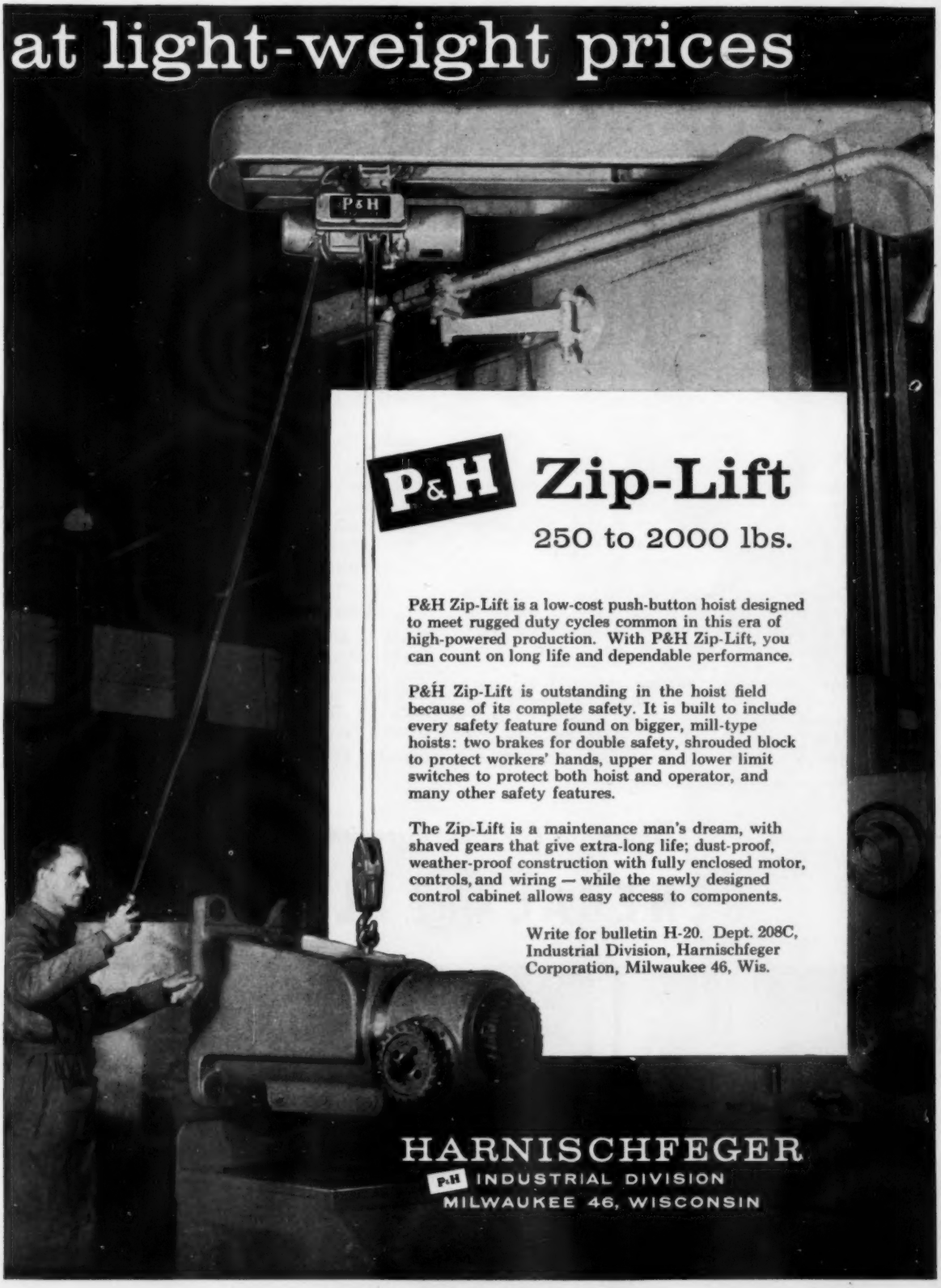
here's a heavy-duty hoist

at light-weight prices



P&H Zip-Lift

250 to 2000 lbs.

P&H Zip-Lift is a low-cost push-button hoist designed to meet rugged duty cycles common in this era of high-powered production. With P&H Zip-Lift, you can count on long life and dependable performance.

P&H Zip-Lift is outstanding in the hoist field because of its complete safety. It is built to include every safety feature found on bigger, mill-type hoists: two brakes for double safety, shrouded block to protect workers' hands, upper and lower limit switches to protect both hoist and operator, and many other safety features.

The Zip-Lift is a maintenance man's dream, with shaved gears that give extra-long life; dust-proof, weather-proof construction with fully enclosed motor, controls, and wiring — while the newly designed control cabinet allows easy access to components.

Write for bulletin H-20. Dept. 208C, Industrial Division, Harnischfeger Corporation, Milwaukee 46, Wis.

HARNISCHFEGER

P&H INDUSTRIAL DIVISION

MILWAUKEE 46, WISCONSIN

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GENERAL ELECTRIC LIMITAMP* STARTERS OFFER MAXIMUM PROTECTION FOR PERSONNEL AND EQUIPMENT

Maximum personnel and equipment protection is a built-in characteristic of General Electric's Limitamp starter. Here are the protective benefits offered by Limitamp control:

For operating personnel—High-voltage compartments cannot be entered until the starter is isolated from the power source. This is done by a gang-operated isolating switch that is actuated by the top-compartment door handle.

For maintenance personnel—The gang-operated switch isolates the starter and its load, and provides a visible check to assure personnel that there is no high-voltage power to accessible components.

For equipment—The isolating switch is mechanically interlocked with the contactor to assure load is removed from starter before switch is operated. The completely co-ordinated electrical design of Limitamp provides optimum equipment protection.

*Reg. Trade-mark of General Electric Company.

MORE LIMITAMP CONTROL FEATURES

Personnel and equipment protection is but one benefit. There are many more. For instance:

- Flexible arrangement of units and space savings because all connections are made from front.
- Extra five-square-foot space savings on large motor applications by using higher-capacity fuses to eliminate need for extra fuse cabinet.
- Easy installation made possible with roll-out contactor unit and front-connected devices.

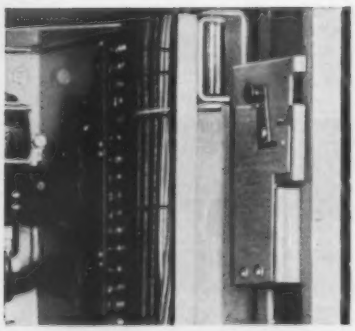
REALIZE THESE BENEFITS NOW

Don't be satisfied with "old-fashioned" high-voltage motor control: Specify General Electric's Limitamp control—*leader in design and performance.* Contact your G-E Apparatus Sales Office today, or write for Bulletin GEA-6331, to Section 783-4, General Electric Co., Schenectady, N. Y.

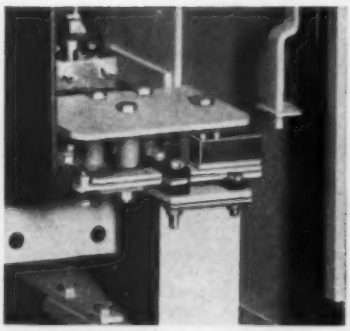
Industry Control Department, Roanoke, Virginia.

Progress Is Our Most Important Product

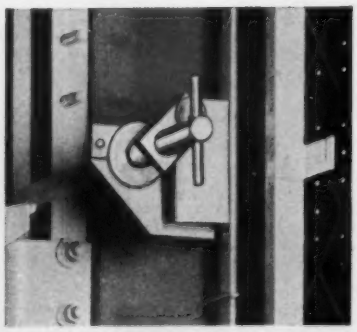
GENERAL ELECTRIC



1 ELECTRO-MECHANICAL INTERLOCK assures that load is completely removed before the isolating switch can be operated.

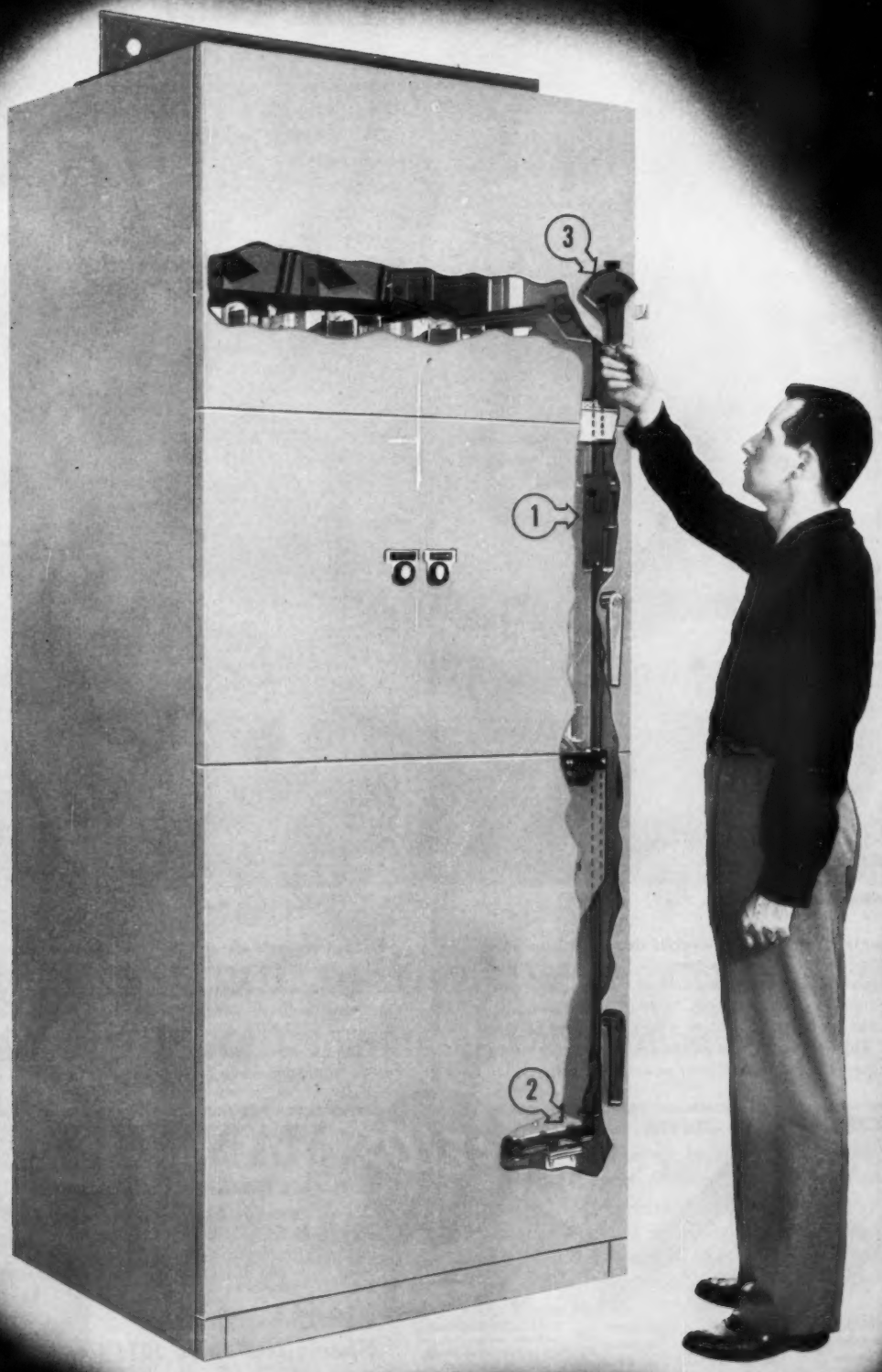


2 INTERFERENCE INTERLOCK prevents opening isolating switch under load, opening high-voltage compartments until unit is isolated.

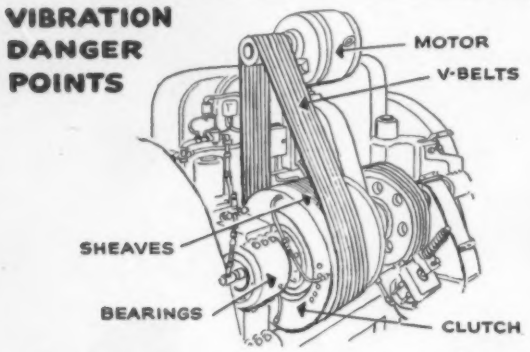


3 ISOLATING SWITCH, operated from outside the enclosure, isolates the accessible high-voltage components from the power source.

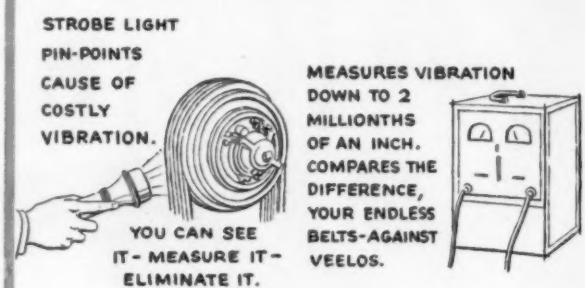
....LEADER IN DESIGN AND PERFORMANCE



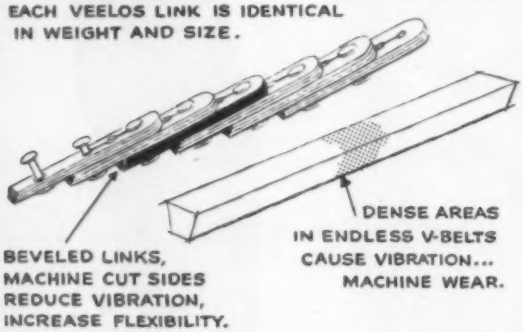
Here's Proof! Veelos Adjustable V-Belts Stop Costly Vibration in Your Drives



1. Watch out for these danger points. Machine vibration is caused by out-of-balance: in the motor, bearings, clutch, sheaves or V-belts. Often it is in the V-belts alone. This deadly vibration results in excessive machine wear, costly breakdown. But there's no need to guess or worry —your Manheim Veelos salesman can spot V-belt vibration in 15 minutes.


STROBE LIGHT PIN-POINTS CAUSE OF COSTLY VIBRATION.
YOU CAN SEE IT - MEASURE IT - ELIMINATE IT.
MEASURES VIBRATION DOWN TO 2 MILLIONTHS OF AN INCH. COMPARES THE DIFFERENCE, YOUR ENDLESS BELTS-AGAINST VEELOS.

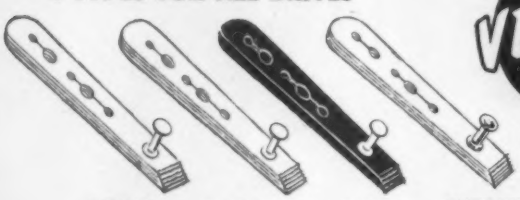
2. Veelos offers you electronic proof! Your Manheim Veelos salesman will prove that Veelos cuts V-belt vibration up to 89% *more* than any belts you're now using. This amazing vibration analysis pin-points the belt that has the "invisible shakes" . . . and tells you exactly how much money-costing vibration is present. You owe it to yourself and your company to see this Veelos V-belt test.


EACH VEELOS LINK IS IDENTICAL IN WEIGHT AND SIZE.
BEVELED LINKS, MACHINE CUT SIDES REDUCE VIBRATION, INCREASE FLEXIBILITY.
DENSE AREAS IN ENDLESS V-BELTS CAUSE VIBRATION... MACHINE WEAR.

3. Install Veelos for smoother drives! Balanced construction of Veelos belts assures you faster, cleaner work, less rejects—less bearing wear. Each Veelos link and stud is identical in size and weight. As you know, endless belts have varying spots of density which cause excess vibration. This excess vibration increases chatter marks, machine wear and overall poor production output.

4. Veelos won't stretch any more than any other V-belt, when correctly installed on properly belted drives. Remember to follow the simple instructions on every reel—measure Veelos 1" per foot short of pitch length and roll on drive as tightly as possible. When installed this way, tension may *seem* excessive. However, this initial tension drops to normal when drive begins to run.

4 TYPES FOR ALL DRIVES



REGULAR For general service

OIL PROOF For oily and hot drives

COATED For wet or oily drives

STATIC-CONDUCTING (with non-ferrous studs) For explosive atmosphere, oily and hot drives

For all sizes and types of drives. Double-V available for serpentine drives.

VEELOS® THE BALANCED LINK V-BELT

Known as Veelink outside U.S.A.

MANHEIM

451 Qualified Distributors

Write for free Veelos Data Book or Veelos Vibration Demonstration to: Manheim Mfg. & Belting Co. 804 Stiegel St., Manheim, Pa.

"Industrial Belt Specialists since 1911"

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Why a STEEL BUILDING is your practical choice for a long-lasting, expandable warehouse

Steel buildings are ideally suited for reliable warehouses, offices, and manufacturing and storage buildings because they can be erected quickly and easily to give you the utmost in strength and durability.

They can be erected in standard sizes, then expanded whenever the need arises. All-steel buildings provide top protection against fire and bad weather. And from an economy standpoint they offer a double saving—no direct design expense plus low maintenance costs.

Factory-Built Steel Buildings, fabricated from USS Galvanized Steel Sheets with USS Structural Steel framework, are pre-engineered with standard materials. Foundation plans are simpler; erection is a matter of days. For details, write to United States Steel Corporation, Room 2831, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

UNITED STATES STEEL

USS

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Photos courtesy of National Screw and Manufacturing Company

"Controlled Dumping Results in Fewer Damaged Threaded Parts" . . . reports National Screw and Manufacturing Company's Cleveland Plant since their adoption of the new Powell tapered-nose box. The tapered-nose design permits better control of dumping with the result that product "rejects" have been materially reduced.

At National Screw this versatile open-end stacking unit doubles as working box or storage unit. In addition to minimum floor space requirements and excellent handling and stacking properties, the customer likes the tapered-nose design because it is easily handled by fork truck. In minimum head room areas it may be dumped by hoist.

The tapered-nose box is another Powell "first" . . . and an important contribution to more efficient mass materials handling. Literature upon request.

POWELL PRESSED STEEL SINCE 1920

The Powell Pressed Steel Co.

DEPT. 8-117 HUBBARD, OHIO

243

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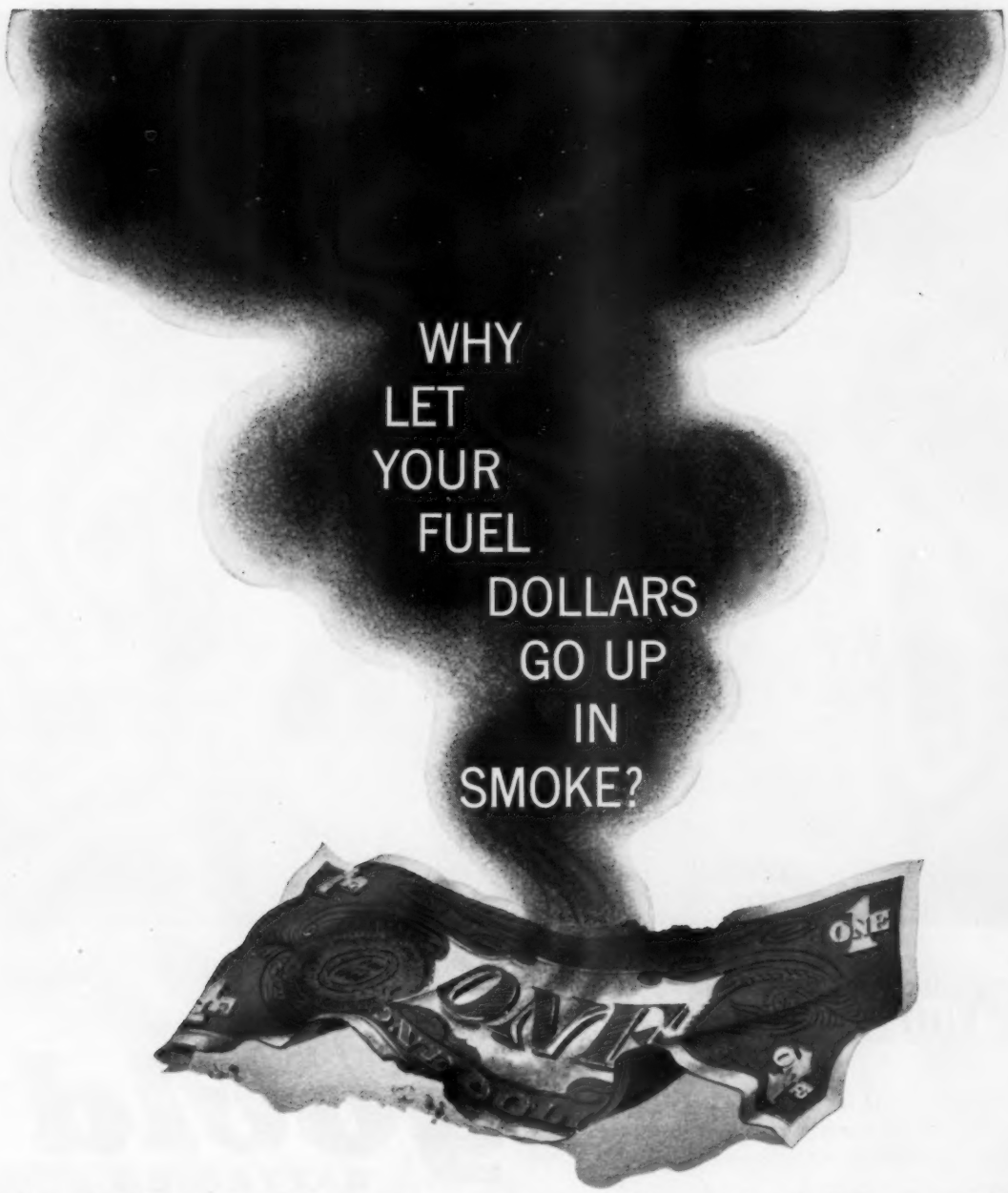

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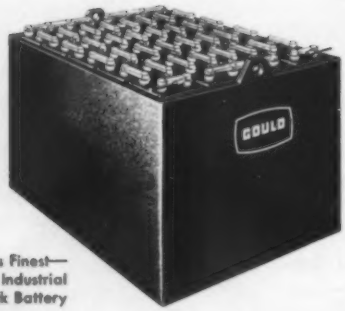

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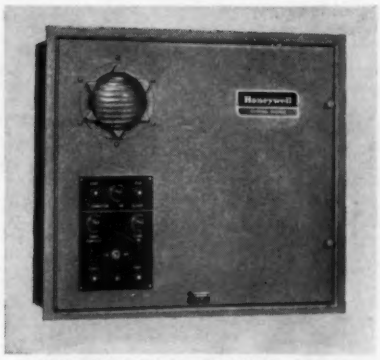

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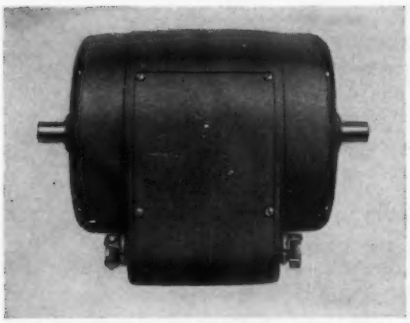

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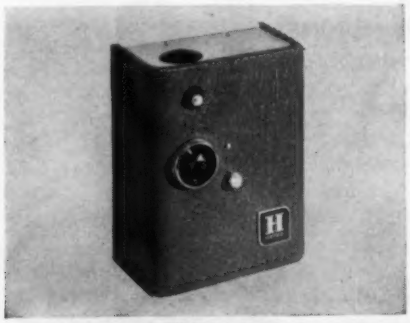

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"Yarway Traps do everything we ask of them."

Q. Mr. Weaver,* you have a lot of Yarway Impulse Steam Traps here at the Prior Tire Company plant. Why do you use Yarways and how do they perform?

A. Yarways, for our money, are wonderful, trouble-free little steam traps. They do everything we ask of them and since the time they were installed in October 1956, they have performed perfectly.

Q. Where do you use Yarways, chiefly?

A. We have 31 Lodi Steam Tire Recapping and Vulcanizing Molds, and each is individually trapped with a Yarway.

"Each of our 31 Tire Recapping and Vulcanizing Molds is individually Yarway trapped."

Q. Does this operation demand any special performance from a steam trap?

A. Well, yes. In tire recapping there are three important elements—time, pressure and temperature. On two of them Yarway traps make a big contribution. They save *time* by bringing our molds up to operating temperatures fast. Then they maintain the hot, even *temperatures* necessary to keep our production at high level. The small size of the Yarway is an advantage, too, since it greatly simplifies our piping arrangement.

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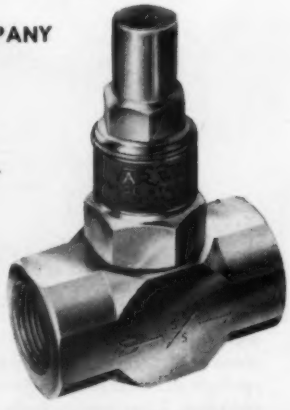
•JACK WEAVER, Plant Manager, Prior Tire Company, Atlanta, Ga.



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PLANT ENGINEERING
November, 1957

What's Just Ahead in This Issue?

SIMPLE, sufficient and supervised—that's what the author of the article on Plant Protection Systems says are the three necessary properties of a good system. In this article he shows how the system installed at UCLA has these qualities and what it has done for fast, accurate reporting of troubles in their plant. The article starts on page 100.

WHAT company doesn't have trouble trying to locate the plant engineer or some of the maintenance people when they are out in the plant? The Berger Company feel they have found the answer to this problem by installing a radio paging system. With it, they are now able to get in touch with their man no matter where he may be in the plant. For details of this paging system, see page 120.

ARE YOU planning to extend your 240-v power system? Before you do, be sure to read about the advantages of higher voltages. You will find graphic comparisons and costs for complete systems plus how-to-do-it information on changing feeders and equipment to the new voltage. See page 94.

YOU DON'T like dusting concrete floors? You don't like to see oil soaking into the concrete or wood? Neither did the plant engineering department at Boeing. So, it now has easily-cleaned floors on which workers can play shuffleboard—during lunch hour, of course. To read how they did it look at the article on page 108.

BUYING a machine is one thing, preparing the proper foundation for it is another. The article, beginning on page 111, outlines 11 checkpoints to guide you in seeing that everything is taken into consideration when erecting a machine foundation.

WHEN the question "How will it affect us tax-wise?" is raised, the plant engineer can help materially to make the right decision. The pros and cons of straight line depreciation of equipment or the declining balance method; whether old machinery should be repaired, traded in, or sold for what it is worth, are only a few of the subjects touched upon. For a simple, clear explanation, by a tax expert, of these and other problems, turn to page 122.

ARE YOUR insulation specifications up to date or obsolete? Have you made changes to eliminate unnecessary heat loss, or to take care of the higher temperatures? With fuel prices on the increase, it will pay you to review your insulation specifications. See article on page 106.

Why 480-Volt Power Distribution?

Economic Analysis Proves Higher Voltages Are Cheaper

By DONALD BEEMAN, Manager, Industrial Power Systems Engineering, General Electric Company

OLD PLANTS were generally started with a 240 v secondary power system but if built today would use a 480 v system. The reason for using the 480 v system is primarily an economic one. As shown in Fig. 2, 480 v systems cost about 35 per cent less than 240 v systems. This saving starts at secondary switchgear and goes right to the motor terminals.

Drawout switchgear for the secondary of 1000 kva, 480 v unit substations cost about $1000 per feeder position. For a 1000 kva, 240 v substation this cost is about $1800 per position. Twice the ampere rating is required for a 240 v circuit as for a 480 v circuit, as well as higher interrupting capacity for the same kva size transformers.

Fewer Circuits

Take a load of 400 amps per secondary feeder at 480 v. This requires only one 500 MCM interlocked armor cable. With the same number of feeders at 240 v it would require 800 amp per circuit or two 500 MCM cables per phase, doubling the cost.

You can see that this quickly adds up when the installed cost of one three-conductor 500 MCM interlocked armor cable is about $7.50 per ft. Fig. 1 shows the cost per ft for smaller 240 v and 480 v circuits. These savings are even greater for larger circuits. Similar savings are made in plug-in busway and panelboards. Branch circuit wiring is also less expensive at the higher voltage.

Combination motor starter costs are shown in Fig. 3 for motors up to 50 hp. Note that the 220 v cost more, on an average, than the 440 v. Also, the motor starters are smaller at the higher voltage as shown by the example in Fig. 4. Motors are generally the same price rated 220 or 440 v.

The 240 v system can be built for the same percentage voltage drop as a 480 v system but it would take much more than twice the copper, particularly on longer feeders where voltage drops are greatest. Generally, the extra copper is not put in 240-v systems and as a result there is more voltage drop, hence poorer performance of motors, furnaces and other production equipment. This means one can get more production from a 480 v system at less cost in the distribution systems.

When modernizing or expanding an old 240 v power system, it is well to study whether or not a change to 480 v will prove more economical in the long run.

Not only will the 480 v circuits and equipment purchased for the modernization or expansion program be less expensive than 240 v circuits and equipment, but every time a change or addition is made in the future, money will be saved if the system voltage is 480 v instead of 240 v. There may be fewer 480 v circuits and substations required because larger units and circuits can be used more economically at the higher distribution voltages.

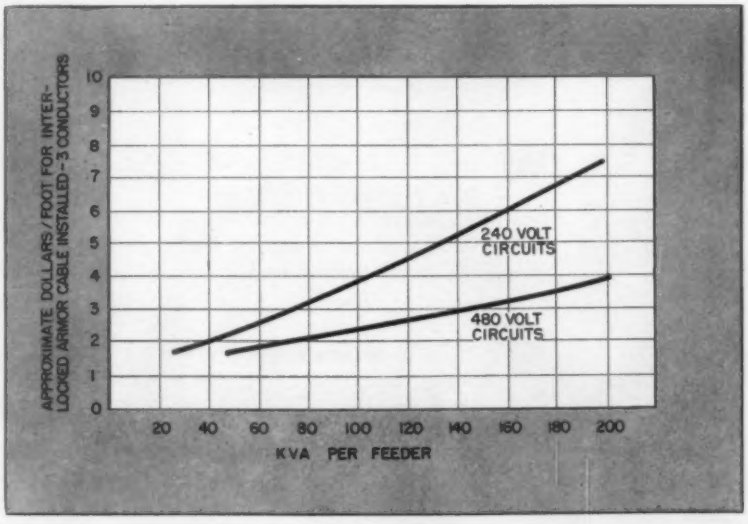
There are many factors which should be studied in arriving at the decision to make an addition to an existing 240 v system at 480 v or to change an existing 240 v system to 480 v. Some of the important items are; age of existing equipment, how much can existing equipment be adopted for 480 v, growth possibilities of the plant, and can the change be made without too much interference with production?

New Areas

When an expansion is made it is easier to get started if the expansion is in a new area. 480 v can be easily adapted without interfering with a 240 v system already in place in an existing part of the plant. Of course, one must then consider how much interchange of process equipment there would be between new and older areas.

It is not the purpose of this article to point out all these circumstances leading to whether or not a change in voltage should be made, because every case is different and it would

Fig. 1. Cost per ft for equal kva capacity is less on higher voltage feeders



require endless detail to cover all possible circumstances. It will, however, outline some of the fundamentals used in such a changeover.

We can restate here that in arriving at the decision whether or not to change, the real dividends and savings from such a change generally are obtained in the future. As the plant grows, savings are made in added capacity and new circuits. All present equipment will eventually become obsolete and have to be replaced sooner or later.

When replacement is necessary, whether it be a circuit breaker, a cable, a bus, a motor starter or machine tool with electrical equipment on it, the replacement cost is almost always lower if the replacing equipment is for 480 v rather than for 240 v operation.

There have been many cases where a plant power system has been changed from 240 v to 480 v. The economies were proven in all the cases and better performance of equipment resulted in some due to less voltage drop. As a result of the study of many of these changeovers some important fundamental principles became evident.

Reduce Voltage Drop

Production should be kept moving while the changes are being made. That precludes just shutting down and changing the power system from 240 v to 480 v at one time. It means that a gradual step-by-step procedure must be used. Examples will be used to represent the important points.

Take the case of the plant that adds new floor area. This can be served at 480 v even though the older area is served at 240 v. In this case the new substation capacity would be 480 v as well as the entire new power distribution system.

New production machinery can be purchased equipped with 440 v motors and control. However, there will undoubtedly be existing production equipment equipped with 220 v motors and control that will be moved into the new area. If the motors are reconnectable to 440 v then those reconnections can be made when the motors are moved and the overload heaters changed in the motor starter.

The contactors are generally the same for 220 v or 440 v motors except for the current carrying ability. One that is large enough for a given 220 v motor is more than ample from a current rating standpoint for an equivalent 440 v motor.

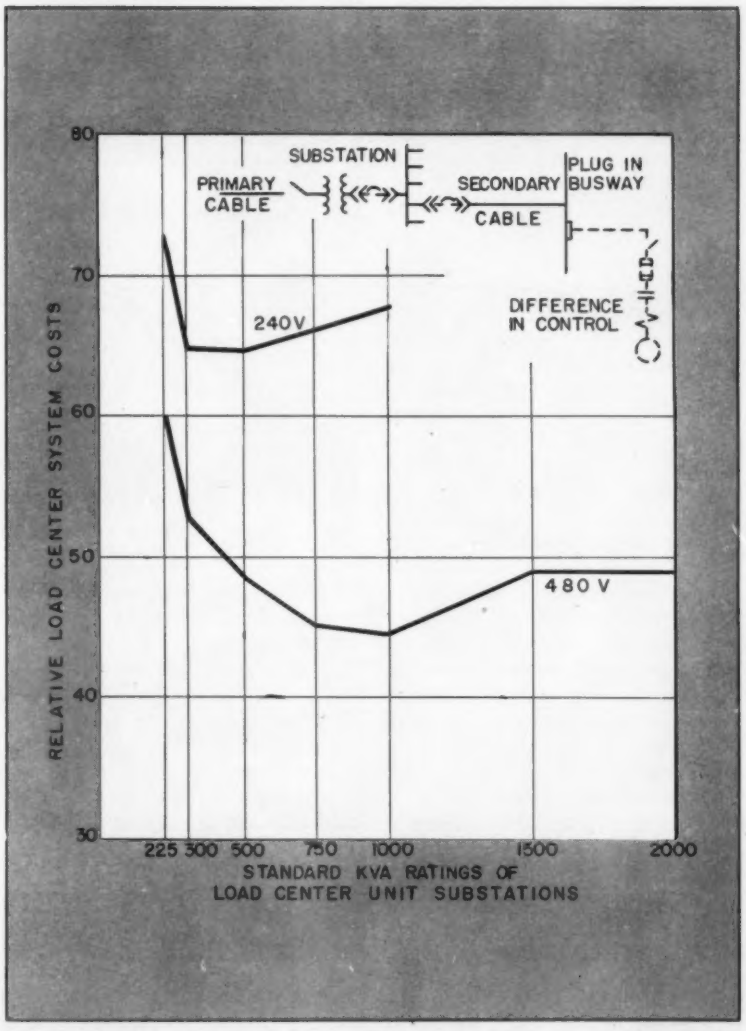


Fig. 2. Relative costs of various complete distribution systems at 240 v and 480 v

When a combination motor starter is involved, the circuit breaker or fused switch ahead of the contactor may have to be changed. If it is a circuit breaker, it must be good for 480 v and have the proper trip coils on it. If it is a fused switch, it must be good for 480 v and have the fuse clips changed to accommodate 600 v fuses. If an older motor is not reconnectable from 220 v to 440 v, then the motor may be rewound.

It has proven advantageous where a change in secondary distribution voltage is made, to obtain a few 480 v to 240 v transformers. These may be either two winding or autotransformers, of various kva sizes like 3 and 5 and 10 kva, 3 phase, or single phase for making up into 3 phase banks. They may be used to temporarily serve a non-reconnectable 220 v load from the 480 v system. Or they may be used to serve a 440 v equipment from 240 v system when moved from the 480 v area into the 240 v area.

When the transformer is ahead of the control equipment no changes need be made in the control equipment for a move from either voltage area to the other. However, if the transformers are not used and if a 440 v motor or load equipment is reconnected for 240 v operation, then higher ampere rated control or motor starters would be required because of the increase in full load

current of the 440 v equipment when reconnected for 240 v operation.

Using the small 480 v to 240 v transformers enables equipment to be moved freely from one voltage area to another by merely inserting the transformers in the branch circuit ahead of the equipment and its control. They may be used to buck or boost the voltage.

Savings up to about 35 per cent can be made in the secondary power system for the new addition by using 480 v instead of 240 v. Some of this saving will be offset by reconnection costs for motors moved from the existing 240 v area to the new 480 v area. Of course, there will also be the cost of new motor overload heaters and perhaps changes in the short circuit protective devices associated with the 220 v combination motor starters re-used at 480 v.

In addition, there will be the cost of a small stock of 480 v to 240 v auto-transformers and their associated installation expenses. A study is required to see where the economic balance lies. For the average case the economics will generally be in favor of making any addition at 480 v that is large enough to require a new service or new substation capacity.

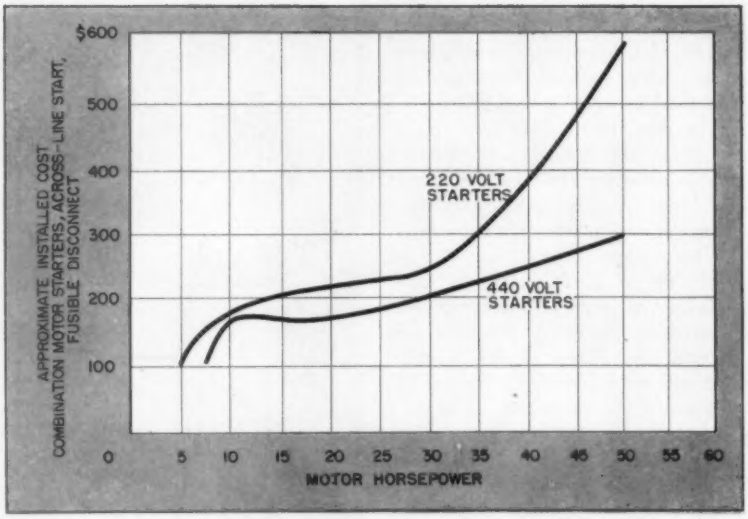


Fig. 3. Plants with large motors can show real savings on starter costs at 480 v

This is particularly true if one looks at the future, which in nearly all cases means more load, hence more power system capacity. The future power systems savings should be considered in the overall picture as a total net savings as no utilization equipment costs are involved then.

Older areas can be changed from 240 v to 480 v distribution. Such a change should be considered when some major part of the system, like the main secondary switchgear, substation transformers or secondary feeder cable has become obsolete and should be replaced.

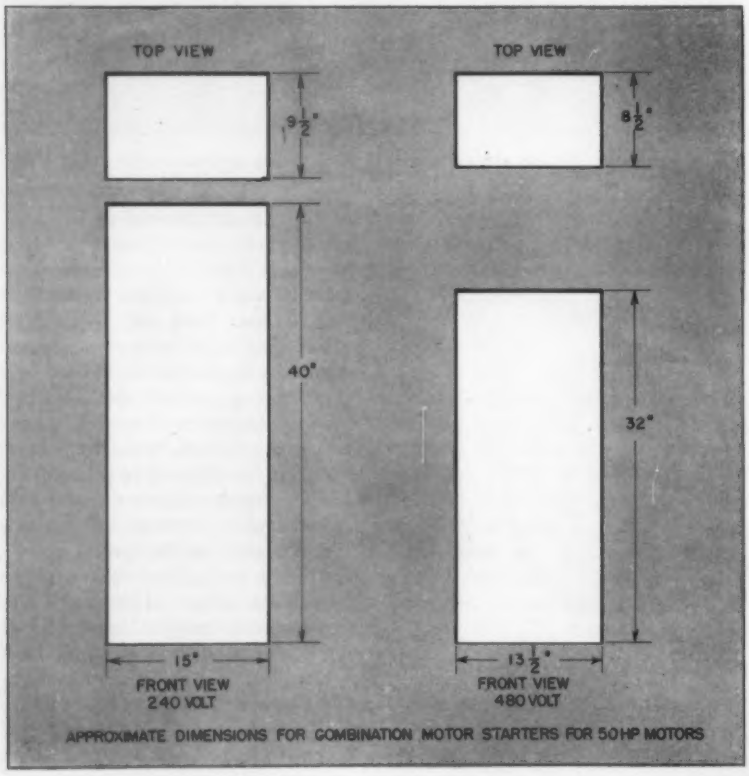
The first step in such a study is to catalog all utilization equipment to see how much can be reconnected and reused at 480 v, how many branch circuit protective devices would have to be changed or replaced and how many 480 v to 240 v small transformers would have to be purchased for those loads that could not be changed for service at the higher voltage.

There should be included in this study a small stock of 480 v to 240 v transformers to permit flexibility of movement of utilization equipment from one voltage area to another when the changeover is being made. The transformers also permit changing a piece of equipment from 240 v to 480 v service without making any change in equipment for the moment.

When time permits, the equipment can be changed and the transformer used elsewhere. After this is done prepare a tentative cost estimate of making those changes. Then estimate the cost of new substation capacity and new secondary feeders where needed at 480 v and 240 v.

Comparison of the savings in substation and secondary system cost

Fig. 4. Size of 480 v starters permit closer spacing on multi-motor equipment



with the extra cost of reconnecting and changing utilization equipment, additional 480 v to 240 v transformers, and branch circuit protective devices will give an indication of whether to pursue the question further.

There are, of course, other savings to be accrued in the future because every new piece of equipment added is almost always lower in cost when rated for 480 v rather than 240 v service.

Planning the Changeover

Changes of this kind require a lot of planning, the exact nature of which depends on the particular conditions in a given plant. Here are some ideas that may be useful in planning such a changeover.

There must be a source of both 240 v and 480 v available for a period of time. Therefore, the existing substation or service should be left in place until after the 480 v supply is available and the secondary feeder reconnected as outlined in the following. A one line diagram of part of the overall system during the transition period after installing the new 480 v load center unit substation or service is shown in Fig. 5.

Once the new 480 volt source and secondary feeder protective devices are in place the changing of the feeders from 480 v to 240 v and connecting them to the new 480 v secondary feeder switchgear may begin. Several approaches may be adopted depending upon the nature of the load connected to each secondary feeder. It may be a case of economics or convenience that determines just which way the secondary feeder changeover can be made.

One method that may be used is to employ a 480 v to 240 v transformer in the feeder and just remove the feeder from the 240 v bus and connect it to a 480 v feeder breaker position as is shown for Feeder E, Fig. 5. This method allows very quick changeover but does not solve the real problem of converting the load equipment for service at 480 v.

Transformers may be employed where speed of changeover is paramount or where the feeder supplies only a few large loads like furnaces that could not be readily converted to 480 v operation. Some shifting

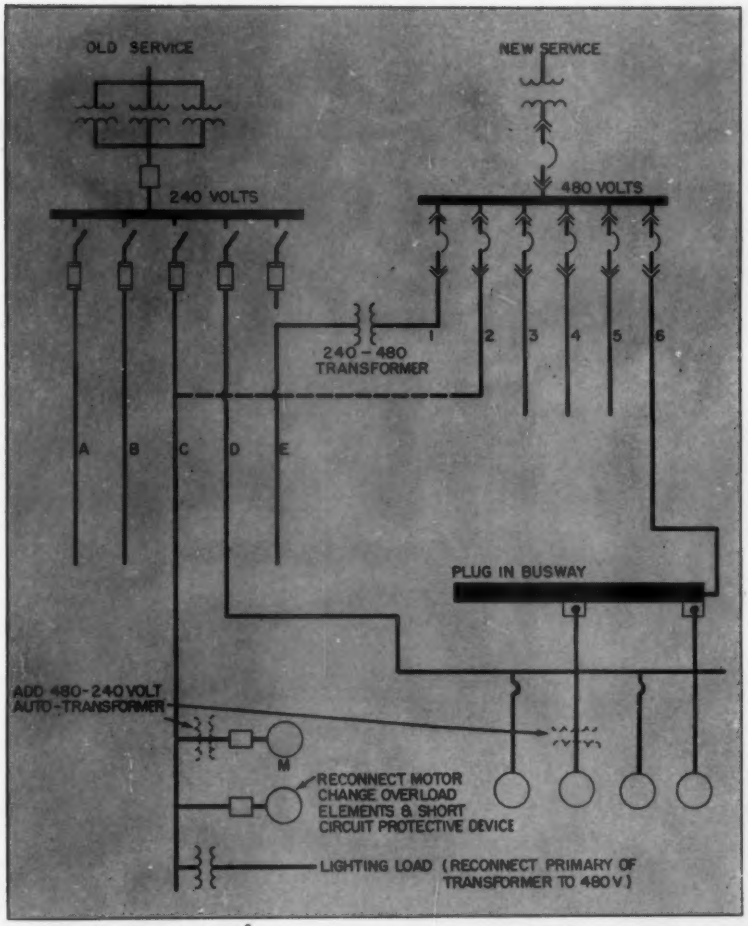


Fig. 5. Transfer of loads from 240 v to 480 v can be done in many different ways

of loads may be done to get all nonconvertible loads on one feeder as shown in feeder E, Fig. 5.

Another method is to run a new 480 v feeder into the area and install plug-in busway as with Feeder D, Fig. 5. Then the loads can be converted one at a time and switched from the old 240 volt Feeder D, Fig. 5, to the new 480 volt Feeder 6, Fig. 5. This method requires new secondary feeder cable but offers an orderly changeover.

New feeders are particularly attractive in cases where the old 240 v feeders have reached a point where the insulation is in poor condition and they should be replaced anyway. After the load is shifted over to the 480 v feeder, the old 240 v cable may be retired and scrapped, a credit in favor of the 480 v system.

Removing the load from the 240 v substation, the transformer shown for Feeder E, Fig. 5, may be installed initially and then the load converted as explained for Feeder D.

Another method is to obtain some small dry-type transformers and use them for some loads as shown by the dashed lines on Feeder C, Fig. 5. Those motors and loads that can be reconnected are reconnected. This method requires shutting the feeder down, reconnecting loads and installing and connecting the dry-type transformers all at one time.

When this can be accomplished over a weekend it could be done one feeder at a time. Such a scheme would be employed only if the secondary feeder cable was relatively new and it was desirable to re-use it. Also, the shutdown period must be obtained.

There are also combinations of these methods and the shifting of loads from one feeder to another that can be used to expedite such a changeover. Only a very careful study of a particular job can reveal the best way to accomplish the changeover. **End**

Plant Engineering Vs. the Asiatic Flu

Crash Program at Merck Sharp & Dohme Gets Vaccine Rolling

Development Engineer Vic Hall checks operation of egg cutter which he designed

THE THREATENED epidemic of Asiatic influenza has mobilized public health officials, the medical profession and drug manufacturers in a fight to spare Americans from the disease.

Six American drug manufacturers are working feverishly to produce this fall the millions of doses of vaccine necessary to provide immunization against this flu. Plant engineers are part of the team in each plant that is achieving near miraculous performance in making the vaccine quickly available.

Merck Sharp & Dohme engineers estimated the costs, designed, constructed and installed new facilities for producing large volumes of the flu in less than thirty days from the word "go". This meant that trucks and trays to handle an input of 160,000 eggs per day had to be designed and procured. Incubators for holding twice this many eggs had to be installed and tested. A huge cold vault with twenty tons of refrigeration adequate to chill the daily output of eggs had to be purchased and installed. Work tables fitted with

General Supervisor of Influenza Vaccines, day shift, Robert Wright, at the left, and Project Engineers Joseph Pirolli and John Manella, check up on the alignment of trucks in the cold vault at Merck Sharp & Dohme's pharmaceutical plant

necessary solenoid controlled vacuum outlets had to be provided for over a hundred people per shift.

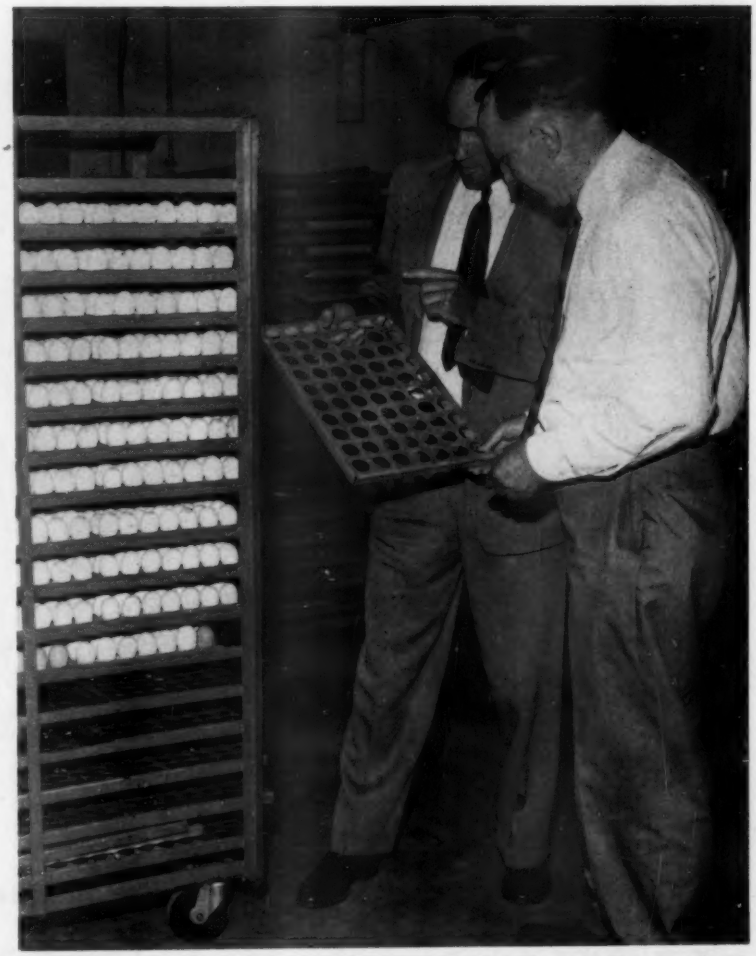
Egg cutting machines previously developed by Merck Sharp & Dohme's engineer, Victor C. Hall, had to be provided in quantity.

In order to provide the space, tablet compressing machines, giant mixers, vacuum dryers and other equipment had to be moved. This space is used for the sterile processing phase of the vaccine production.

A 30 ft high by 100 ft wide masonry wall had to be erected to isolate the new space from other processes in the existing building. New toilet and wash facilities for 125 people per shift were installed.

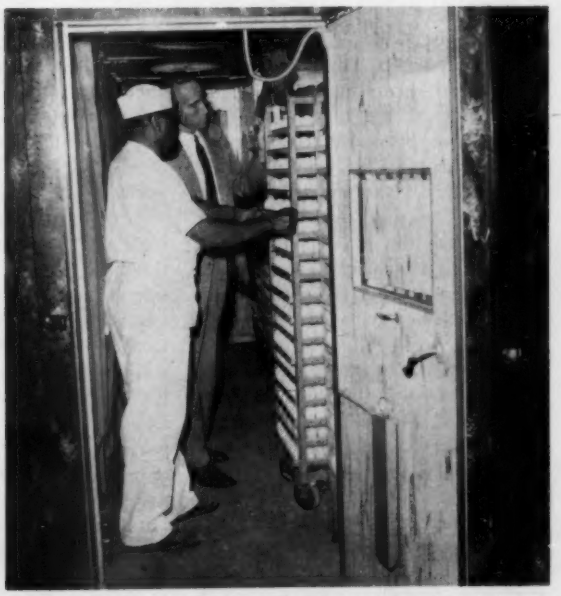
The entire schedule had to be planned so that the facilities would be available for the first shipment of eggs which had to be ordered at the time of the word "go". Plant engineers were part of a smooth team working to make the vaccine.

While the facilities were being constructed, some 400 people were being hired and trained. In addition to providing new facilities, plant engineers had to arrange for the disposal of 7½ tons of eggs per day after harvesting the vaccine. They arranged to use an existing incinerator where a continually high temperature can be maintained to completely burn any volatile elements and eliminate all possibility of creating odors. **End**



Chief Design Engineer Jerry Stuart, left, and Project Manager Herman Marnet going over special trays and trucks designed specially for the handling of eggs

Project Engineer Joseph Pirolli checks installation of sterilizers for glassware used in the vaccine development process



Chief Design Engineer Jerry Stuart checks spacing of trucks in vault where the Asiatic flu vaccine is being incubated

Operator at the control panel of University of California's plant protection system recorder. Recorder indicates when abnormal conditions occur; operator checks coded location against listing on board and notifies responsible personnel in area

Plant Protection Systems

Their Planning, Development, Operation and Maintenance

By K. M. BRADY, Senior Superintendent, Buildings and Grounds, UCLA, Medical Center

SIMPLE, SUFFICIENT, and supervised—just three average words, but when they describe the design and planning of any fire alarm system, the results obtained will be considerably above average.

To be simple, the design should encompass a simplified decoding system. The first few minutes of any fire are the most critical, and determining the exact location of the device transmitting the alarm must be accomplished with a minimum of confusion.

In addition, the person responsible for recoding the alarm to dispatch fire fighting equipment is under pressure. His position should be thoroughly evaluated. Any system could be considered inefficient if the decoding leads to confusion, regardless of how many other desirable features may be present.

To be sufficient the design should cover more than the basic minimum code requirements of national, state, and local authorities. Many additional features of value to plant engineers and management may be incorporated into our modern alarm systems. Such features as water-flow indicators, spot fire locators, valve position indicators, control over security areas, door supervision, and high and low temperature indications are examples. In fact, any operation may be remotely supervised which could be adapted to local, manual operation.

To be supervised, the design of the system should meet the most exacting demands in all other categories. However, if the entire system is not designed to operate as a supervisorial system, it leaves the factor of reliability of the entire system in serious question. A properly supervised system leaves no question as to the ability of the system to accurately and intelligently record the next alarm or condition transmitted.

Without supervisorial design, an open, or off-normal, condition could exist without the knowledge of plant engineering, and of course, would result in failure of the next alarm being recorded (and this would not be known to the person responsible for dispatching help). This could lead to other real problems if the failure were in manual station actuated by an individual.

In many cases, plant engineers who are called upon to work with consulting architects and engineers in the planning of new buildings or in remodeling present facilities are inclined to overlook the important details of fire alarm systems. Generally, and unfortunately, many accept a system as designed. And too often the design just meets the minimum requirements.

It would be unrealistic for us to

expect the average architect or engineering firm to consider adapting special devices, not called for in the code requirements, to operate in conjunction with alarm systems. Naturally then, it behooves plant engineering to explore, on its own initiative, the adaptability of auxiliary devices to their operational needs.

Modern fire alarm systems are highly specialized, and each manufacturer has much to offer. The economies and efficiencies that can be effected with a complete system are far reaching. For example, personnel that is assigned to inspect liquid levels, pressure or temperature conditions at remote points, could be relieved of these duties by means of automatic devices. In addition to man power economies, coverage of such remote operations by instruments would give "round the clock" efficiency.

It is to the advantage of management to check with their local fire rating bureau to determine the percentage of fire premium reduction for their particular classification by the installation of an extended system. On the Pacific Coast, overall reductions of up to 25 per cent have been realized.

In the planning of any fire alarm system the following basic points should be considered:

1. The plant involved will require specific study if the optimum system is to be achieved. We must remember that there are no standard specifications.

2. The nature of the manufacturing plant will generally govern the location of the recording device. It should be located in an area having the most extended hours of worker coverage. Thought should be given to periods, if any, in which the recording station is normally unattended. A possible solution to this would be to contract with a local alarm agency which could offer 24-hr coverage at a central point, and relay signals to this point during those times.

Most large plants today have some division within their organizational structure where personnel is on 24-hr duty. Examples are: heating plant, police headquarters, telephone office. Use of this personnel would resolve the problem of recorder coverage. The method of signalling the fire fighting agency in

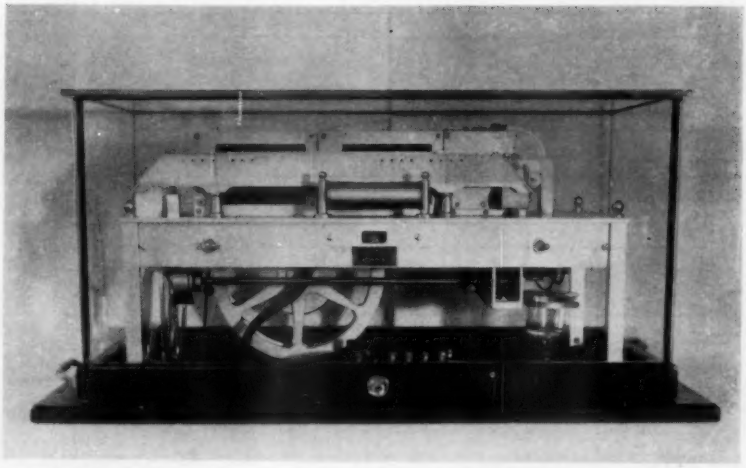


Fig. 1. Punch tape type of register poses time problem because of decoding

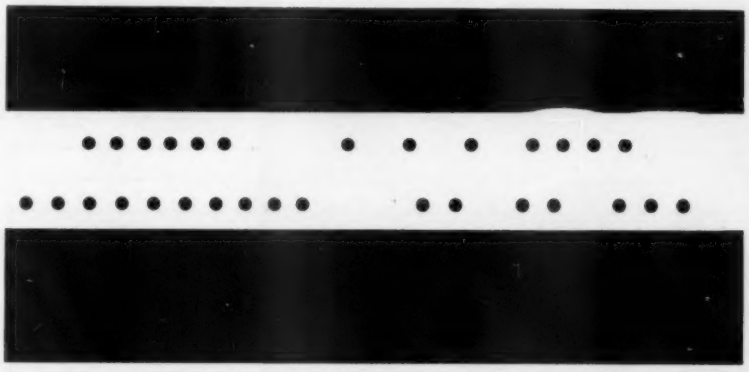
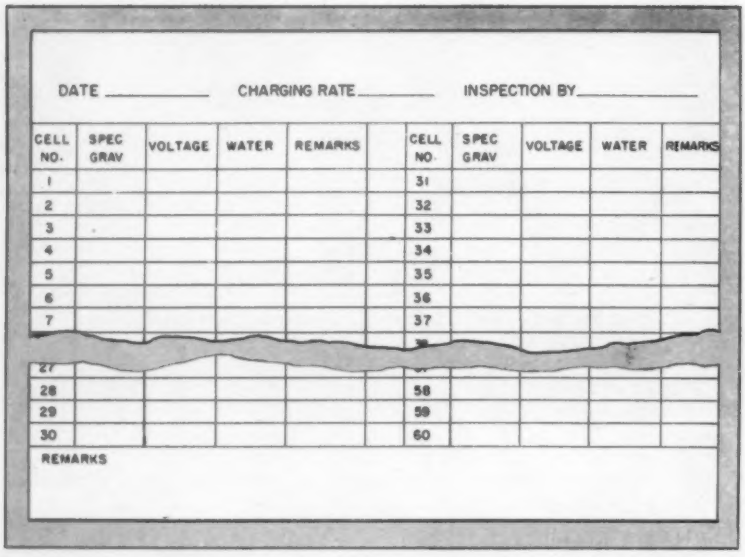


Fig. 2. Tape is product of machine above. Operator counts holes then codifies

VALVE OPEN	5	2	5	U.C.L.A.	1952 MAR 15	PM	12:00
VALVE CLSD.	5	2	5	U.C.L.A.	1952 MAR 15	PM	12:00
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:36
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:36
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:36
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:36
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:36
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:36
FIRE ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:35
AUTO ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:35
AUTO ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:35
AUTO ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:34
AUTO ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:34
AUTO ALARM	2	1	6	U.C.L.A.	1952 MAR 14	PM	2:34
D.C. ON ——	2	1	6	.C.L.A.	1952 MAR 14	PM	2:34

Fig. 3. This is the tape produced by recording console installed at UCLA. First number from left identifies which zone of nine zones is affected; second number identifies which building; third number identifies which floor level



DATE _____ CHARGING RATE _____ INSPECTION BY _____

CELL NO.	SPEC GRAV	VOLTAGE	WATER	REMARKS		CELL NO.	SPEC GRAV	VOLTAGE	WATER	REMARKS
1						31				
2						32				
3						33				
4						34				
5						35				
6						36				
7						37				
27										
28						58				
29						59				
30						60				

REMARKS

Fig. 4. Author uses log sheet at UCLA to record conditions of batteries. Every battery in the multicell bank should be numbered with a lead tag or with acid-resistant paint. Monthly checks seem adequate for the average system. In some cases, temperature, voltage compensated relays are used to control charge

Date _____ Time of Test _____ Box No. _____ Location _____

Personnel Notified: Name Time

Steam Plant _____

B&G Supt. _____

Bus. Office _____

Hosp. Admin. Off. _____

Register Operation Code No. Time

Telephone Office Punch Register Operation _____

B&G Office Punch Register Operation _____

Steam Plant Supervisor Operation _____

Telephone Office Action

Called Steam Plant _____

Information given _____

Paged Engineer _____

Information given to Engineer _____

B&G Office Action:

Personnel contacted: _____

Remarks: _____

Box No. _____ Restored by _____ Time _____ Date _____

Quadrant No. _____ Restored by _____ Time _____ Date _____

Report by _____

Signed _____

Fig. 5. Just one of many types of forms that can be designed to record results

event of mishap should be given serious study. This method will again vary with the type of plant involved. If dependence on a municipal fire station is the case, a direct line to the fire dispatcher's office is often practical. If permitted by the municipality, placing a secondary recorder in the fire dispatcher's office is of mutual advantage. In any event, the information to be dispatched from the recorder must be accurately and quickly handled.

Figure 1 shows a typical punch tape type of register. This unit is in wide use throughout the country, and is considered highly reliable. It does, however, pose somewhat of a time problem in decoding, due to the need for the operator to count each hole punch (Fig. 2) and then convert to a number code. Recognizing this problem, the fire alarm industry has developed registering units which are capable of printing the type of alarm, the code numbers, time and date, and translating this information into printed words. Figure 3 shows an example of this kind of tape.

Recording units may be designed for either console, or desk top mounting. If space limitation presents a problem, the desk mounted unit could be used in conjunction with a remote relay panel. However, the console unit is the most practical installation. This houses the entire recording and relaying units, and is of additional advantage if the unit is to be relocated at a later date.

Zone System Coding

Setting up a code system for all devices can often best be accomplished by the zone system. If the system is designed to serve many buildings over a large area it would be best to establish fire zones. There should be no more than 9 such zones. These zones then would become area numbers of all devices to be installed within the individual zone. These numbers are those in the first vertical row. This immediately identifies the area in which the alarm is originating.

Each building within the zone is then assigned a number (not to exceed nine). This number becomes the second digit of all devices installed in this building (for a total of eighty-one possible building locations). Additionally, if necessary,

(Continued on page 238)

Fig. 1. Overall view of the "minimum" cafeteria at Reuben H. Donnelley's shows the U-shaped set-up designed for efficiency and economy. This unit serves lunch to 300-600 people a day. There is no more equipment, no dishwashing; all service is on paper. From left to right: canned soup kitchen, sandwich unit (not visible), reach-in refrigerator, paper cabinet, cash register, warming oven on top and heating oven below, coffee urns, refrigerated display cabinet with shelves above, iced tea dispenser and rack holding serving trays

Fig. 2. Angled shelves above the counter level offer easy visibility and food service to both sides of this counter. Coffee urns at the end of the counter are self service. Patrons clear their tables, dispose of paper plates

Here's a Small Plant's "Paper" Cafeteria

MOST OF THE business establishments in this country have fewer than 500 employees. A comparatively tiny percentage are large enough for the company to be able to subsidize food service as an employee benefit (although most in-plant food service operations are company-subsidized). Still fewer are large enough and efficient enough to overcome the financial disadvantages associated with one-meal-a-day service to break even.

But, a new concept in food service design makes it possible for an in-plant food service operation to break even or do better, and it can therefore be included in many small-to-medium size plant designs. The concept is applicable to both old plants and new.

As outlined by William Brady, president of Brady Food Service Corp., one of the pioneers in developing the concept, its basic points are these:

First, plan a minimum, but satisfying, menu pattern that permits day-to-day variety but may not offer great choice on a single day. This is the function of a caterer or food service manager.

Second, with estimates of probable patronage and the menu pattern, plan the sizes and types of equipment necessary. In-plant cafeterias can generally count on participation by about ⅔ of personnel, but the number will vary depending on location, other facilities available, etc. Types of equipment are conditioned, of course, by the kind of preparation (fryers for frying, etc.); sizes can be estimated by caterers or restaurant equipment dealers.

Third, lay the equipment out so as to take maximum advantage of food service employees' time and energy, and to make a simple, speedy traffic pattern for patrons. Any food service operation is a "process" from incoming raw or semi-processed materials to distribution to customers. The principles of straight-line flow and work simplification apply. Water and drain connections and electricity or gas will, of course, be needed.

Fourth, eliminate whatever functions can be handled elsewhere, and have them done at a commissary or use commercially prepared food products. Most catering organizations now have commissaries or units at which food can be partly or wholly prepared for service elsewhere.

Fifth, eliminate the time-, labor-, equipment-, supplies- and space-waste of dishwashing, and supplant them with paper plates and other paper food service items.

One such specially-designed all-paper minimum unit is now in operation at the Reuben H. Donnelley Company's New York headquarters, operated by the Brady Co.

(Continued on page 236)

Fig. 1. Water heater jacket, with funnel-like Fiberglas ring attached, is being slipped over water heater tank with its insulation blanket

Here's a case study of cooperation . . . It tells how the engineers of an insulation manufacturer worked with plant engineers of Mission Appliance Corporation to revise manufacturing techniques, insulation application and packaging, and design and install required conveyor sections and controls

Plant-Engineered Line Kills Bottleneck

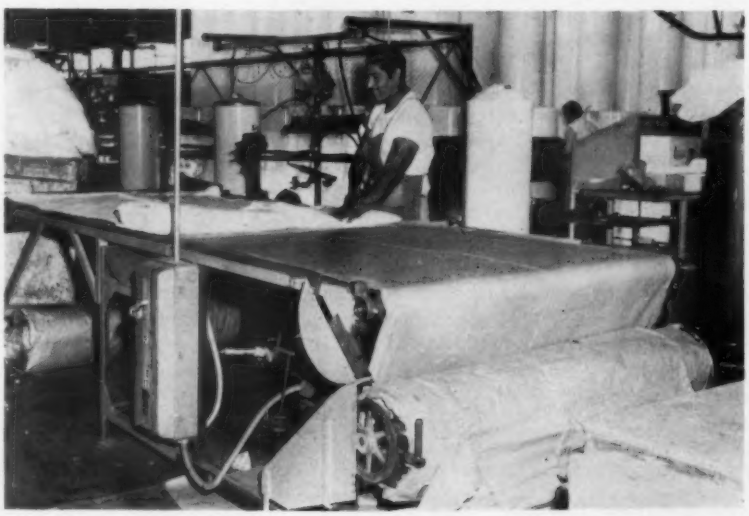
Water Heater Production Gets Boost at Mission Appliance

WHEN PLANT ENGINEERING at Mission Appliance Corporation, Hawthorne, California, recently completed installation of a 95 ft straight-through type enameling furnace, the sudden surge in production of glass-lined hot water heater tanks to about 10,000 units a month created some bottlenecks along the production line that had not previously existed. The most serious of these occurred in the final assembly department where the insulation and jackets were added to the heaters, and in the packaging department where the heaters were cartoned for shipment.

It was obvious in both cases that either the operation would have to be enlarged, with more employees to do the work, or more efficient methods of insulating the heaters and final packaging would have to be devised. Plant engineers chose the latter course.

The job of insulating the heaters and adding the jackets was tackled first. Up until the time, insulation blankets had been hand-cut from large rolls of Fiberglas insulation material, then wrapped around the heater tanks and held in place by a two-piece clamshell jacket while the heater jacket was slipped down over the clamshell jacket. The clamshell jacket was then slipped upward out of the heater jacket, leaving the insulation blanket in place. While effective, this method was time-consuming, and there was no assurance that the insulation blanket would stay in place after the clamshell jacket was removed. Many of these blankets would sag downward inside

Fig. 2. Special table for unrolling pre-cut insulating blankets from paper-backed rolls. Backing paper is threaded from original roll at far left onto take-up roll



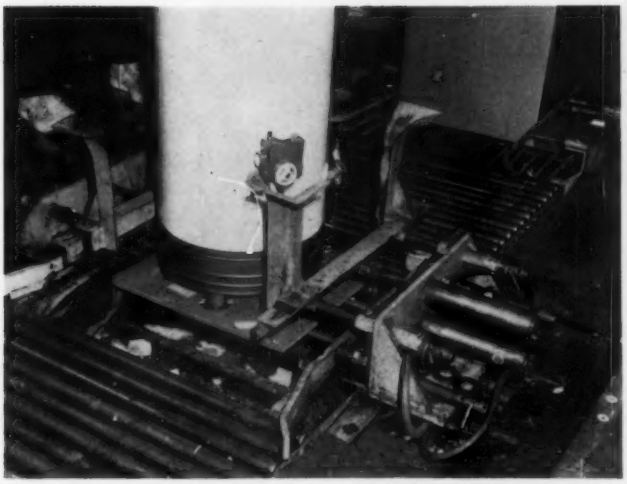


Fig. 3. Here a heater has arrived at packaging machine. Operator has touched a foot switch to cause two short sections of roller conveyor (one on either side of heater carton bottom) to drop and retract thus providing room for the cross-wise flaps of the carton. When carton is in place another foot lever causes conveyors to move back into place, pushing carton flaps into place under bottom

Fig. 4. Right: Packaging operator, on an elevated platform, slips the carton tube into place. He then folds and staples upper flaps

the heater jacket during subsequent handling, thus leaving a portion of the tanks without insulation.

Working in conjunction with engineers from Owens-Corning, plant engineers at Mission Appliance Corporation worked out an entirely new technique for insulating the water heaters. It was decided that the Fiberglas insulating material would be furnished Mission Appliance Corporation in pre-cut insulation blankets, with each blanket center-marked prior to shipment.

These blankets would be packed in lengthwise pairs in large paper-backed rolls, so that when unrolled, two pre-cut blankets would appear at a time. Each blanket would be twice as long as the heater tank body it would cover, and its width would correspond to the heater tank's semi-periphery. Thus when it was folded over the heater tank at the top, with the blanket's center marking at the top, it would drape down on both sides to the tank's bottom.

A two-section, funnel-shaped Fiberglas ring was then designed that could be attached to the bottom of the heater jacket. This ring "funnels" the draped insulating blanket, Fig. 1, firmly around the heater tank as the jacket is slipped downward from the top. The ring then hinges open and is removed from the jacket.

That portion of the blanket that folds over the top of the heater tank is then pierced for the nipples and the flue opening. The remainder of the fold acts as a support for the insulating blanket within the heater jacket to prevent sagging and slip-

(Continued on page 232)

Fig. 5. Heater in background has just passed glue rollers. Carton nearest camera has moved onto the triple belt section where flaps of carton will be held securely

Fig. 1. Outdoor piping view at refinery shows well insulated valve. Straight runs of pipe are finished with aluminum jackets, bends and fittings are covered with an asphaltic weatherproofing compound which is reinforced with wire mesh

Up-Date Your Insulation Specs

By UTLEY W. SMITH, The Magnesia Insulation Manufacturers Association

WITH MANY industrial plants as well as public utilities going to higher pressures and temperatures for their steam generation, it will pay to re-examine your insulating practices.

For too many years, many insulating specifications have remained unchanged despite rising fuel prices and equipment and construction costs. Even without drastic increases in operating temperatures, insulation specifications which have been used over and over again on numerous projects are probably obsolete and in need of revision.

When fuel was less expensive and temperatures lower, it was a fairly frequent practice to omit insulation from flanges, fittings, manhole covers and other similar items

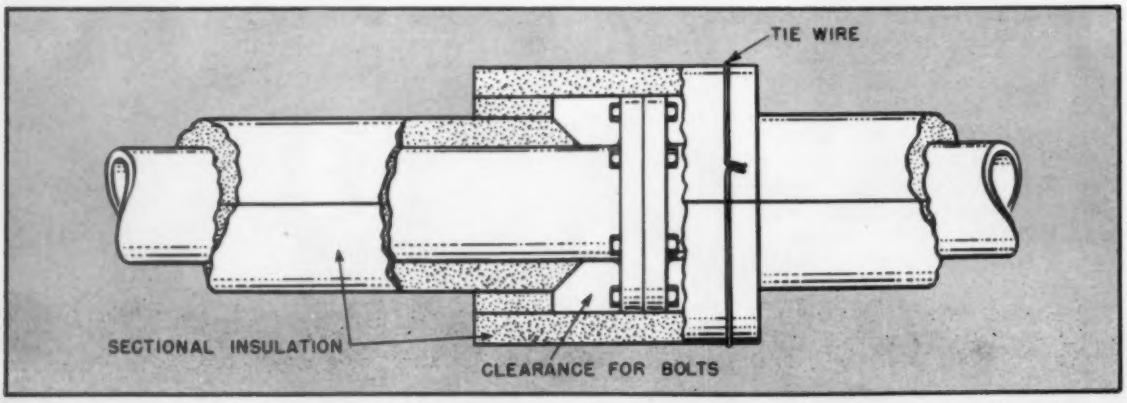


Fig. 2. Section view of flange insulation. It can be removed for repairs without disturbing adjacent pipe insulation

because it was felt that the material and labor costs of insulating these units was not worth the value of heat saved.

For example, in a plant with steam mains at 600 F, a conservative temperature for modern plants, one extra heavy flange on an 8-in. line left uninsulated would waste about 30 million Btu's annually on an 8-hour day operation. This is the equivalent of about 3000 lb of coal. Multiply this by the number of flanges throughout the average system and the loss becomes highly significant.

Other considerations in higher temperatures are the personnel hazards of uninsulated fittings, and the effect on workroom temperature from the radiated heat.

On Writing Specifications

The uninsulated flange is only one rather obvious example. Where engineers have dealt extensively with high temperature, the special provisions required in insulation specifications are included. Here are several examples of how insulation specifications are being written.

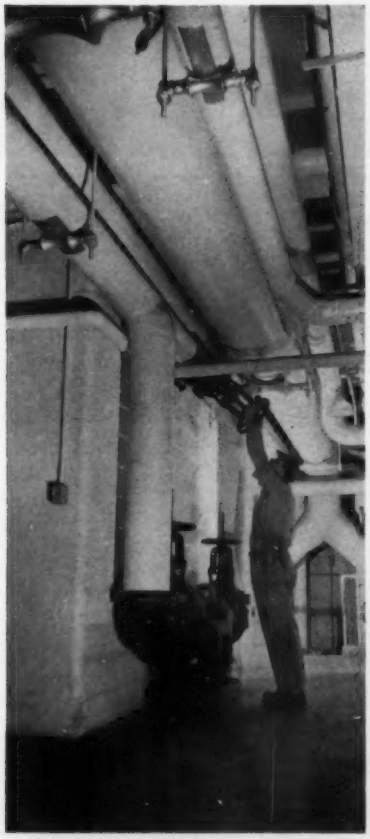


Fig. 4. Insulated piping supported on hangers with metal plates avoids undue heat loss through metal-to-metal contact

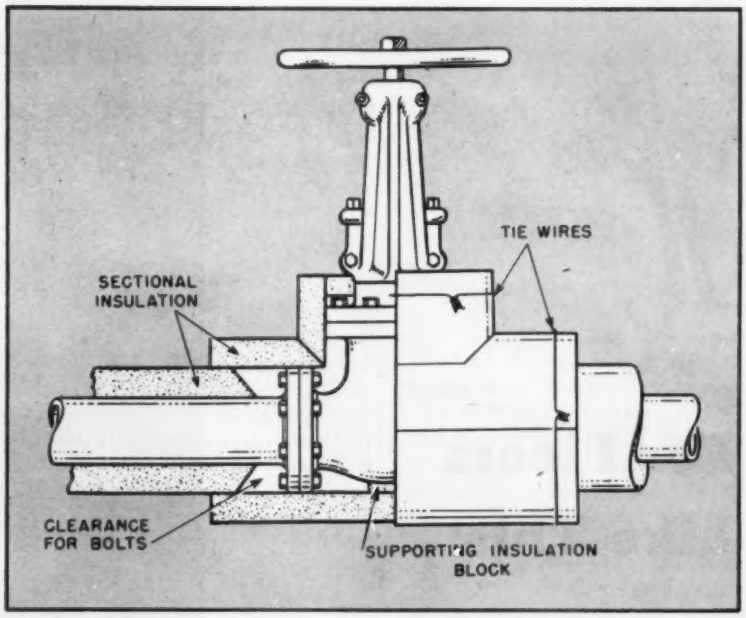


Fig. 3. For small valves use sectional pipe insulation, fitted as shown here; larger valves may require block insulation, cut and mitered, for complete coverage

On the subject of fittings and valves, the specification says in part ". . . the bodies of fittings and the bodies *and bonnets* of valves shall be covered with a combination of block and plastic of the same materials and thicknesses as the insulation on the adjacent piping." This point is emphasized because many other specifications state that the bodies of valves should be insulated *up to the bonnet*. The valve bonnet represents a potential heat loss similar to the uninsulated flange.

Another special provision states: "Wherever outstanding legs or stiffener angles, structural members, ribs or bolted joints occur on ducts and flues, a thickness of at least 2 in. of insulation shall be applied over the outside of such projections."

Here is another area where insulation is not specified or applied in numerous cases and where very substantial heat losses can occur.

One of the other considerations for high temperature operations is pipe hangers or supports. Where hanger or support bars or rollers come into direct contact with hot piping, considerable heat loss can result. On long horizontal runs of piping with few bends or elbows, this can be avoided. By using fitted metal plates to extend the load over a larger insulation surface, pipe hanger rings can be placed around the insulated pipe or the insulation can rest on the bars or rollers. Extensive tests have proven that molded insulations such as 85 per cent Magnesia, calcium silicate, expanded silica and diatomaceous silica have ample load-bearing qualities to support the pipe and their own weight with normal intervals between hangers.

Metal Expansion

Possibly one of the most important insulation factors with higher temperatures is the expansion of piping and equipment. At any temperature which causes appreciable metal expansion, insulation joints will open. Where there are such conditions, the application of double layer insulation with staggered joints is essential.

When the newer insulating materials with greater heat resistance were introduced, it was felt in some quarters that the need for double layer insulation was eliminated because one material would suffice up to those higher temperature limits. This is a secondary consideration. No matter what insulation is used or what combination of products, double layer construction with staggered joints is still essential to avoid

(Continued on page 231)

Rx For Floors Like This:

Elbow Grease, Soft Soap, Floor Sealers

Fig. 1. While not glossy to the point of being dangerously slippery, the sealed concrete floor aisles provide excellent shuffleboard court for employees during the lunch hour, rest periods

EVERY PLANT engineer is well aware of what a dull, stained, and apparently soiled floor can do to the appearance of the most well-kept plant. Despite frequent sweepings to remove loose dirt, and occasional moppings to remove more stubborn soil, the appearance of the floor remains dull and lusterless, and neither of these superficial cleaning efforts affect the appearance of the blotchy stains left by oils and greases, and by the numerous processing and treating solutions used along the average production line.

Of perhaps even greater importance is the increased longevity of concrete and hardwood floors that have not been subjected to the deteriorating effects of oils, greases, and other floor-destroying compounds.

In an effort to improve plant floor appearance, both in the manufacturing and office sections, plant engineers at the El Segundo Division of Douglas Aircraft Company launched a practical investigation of various commercially available floor sealers, and of application techniques which would provide best results. Desired results were 1. high-gloss floor appearance at all times; 2. long wearing properties of the sealer used; 3. ease of initial application; 4. ease of subsequent re-applications; 5. ease of cleaning (no minute dust or dirt traps); and 6. high resistance to scuffing, abrasion, and stains of all types.

Very few such investigations are successful in achieving all the desired goals. This one was an exception. The type of floor sealer finally settled upon, and the techniques worked out to apply it, provide both the concrete and hardwood floor areas in the huge Douglas plant with an almost "ballroom-like" appearance at all times. The gloss shines through despite any temporary loose dirt or litter on the floor. The applied sealer presents a hard, continuous and smooth surface, minus any irregularities that will trap dust.

Stained areas and blotches are conspicuously absent. The traffic-heavy plant aisle floorways remain bright and glossy, and, by merely brushing aside temporary loose dirt, provide excellent shuffleboard courts for employees during lunch hour and rest periods. The sealed, hardwood office floors retain a luster-bright appearance for months after the sealer is applied. The cost of the sealer, and of applying it, is negligible in comparison to the results obtained.

Products used to obtain these results are readily available. The effort expended in preparing the

floor for sealing, and in application of the sealer, is no greater than that required for any floor reconditioning operation. The basic operations are essentially the same for floors which have not been previously sealed, and for re-applications. This applies also to the sealing of both cement and hardwood floors.

In sealing a floor which has not been previously sealed (either concrete or hardwood), it is first scrubbed with hot water containing liquid soap. A mixture of one part liquid soap to twenty parts water is used for the average floor, but for very dirty and greasy floors the soap content should be increased. The liquid soap used by the El Segundo Division of Douglas Aircraft Company is sold under the trade name of "K.D.L.-28" and is manufactured by the Kelite Company of Los Angeles.

Floors which are to be sealed must be thoroughly clean, and in the case of concrete floors, this is accomplished by scrubbing them with a steel brush employing a power buffer. Mopping proves sufficient for most hardwood floors. If wooden floors are in poor condition, it is advisable to sand them prior to sealing.

Immediately following scrubbing, the floor is rinsed with clear water. The rinse water should be changed frequently to insure the complete removal of all dirt and soapy water. When rinsing concrete floors, it is recommended that the water be flooded over the area and removed with a squeegee and mop. On hardwood floors the approved technique consists of mopping the rinse water on and off the floor.

It Must Be Dry

After the area to be sealed has been scrubbed and rinsed, it should be allowed to dry for a minimum of four hours. The first coat of the sealer can be applied as soon as it has been determined that the floor is completely dry. The floor sealer used at Douglas is "Johnson's Traffic Coat". It is applied with a 16-in. lamb's wool applicator and allowed to dry for a minimum of four hours. Weather conditions will affect the drying time.

When required, a second coat of sealer may be applied as soon as the first coat is dry. Concrete floors with a good, smooth finish seldom require a second coat. Such floors with a rough or porous finish usually require a second coat. Hardwood floors will usually require a second coat. The second coat on both types of floors should be applied as thin as possible. Before applying the second coat to hardwood floors, the floor should be buffed with steel wool using a power buffer. After buffing be sure all dust is removed from the floor before applying the second coat.

Floors which have been previously sealed (both concrete and hardwood) should first be mopped with a mild soap solution. It is recommended that the mopping solution be compounded of one to two ounces of a good liquid detergent to each gallon of water. On very dirty and greasy floors, the amount of detergent will have to be increased. A liberal rinsing should follow mopping, then the floor should be allowed to dry for a minimum of four hours.

When the floor is thoroughly dry, one very thin coating of floor sealer should restore the surface.

Although the amount of wear received in a given floor area will determine the time interval for refinishing, the Douglas Plant Engineering department has found it expedient to re-apply the sealer on concrete floors about once each year. Aisles which are heavily traveled may have to be reconditioned more often. The hardwood office floor areas at Douglas are re-coated at from 8 to 10 month intervals. **End**

Fig. 2. Applying floor sealer to an airplane hangar floor. Note difference in appearance between two areas of floor

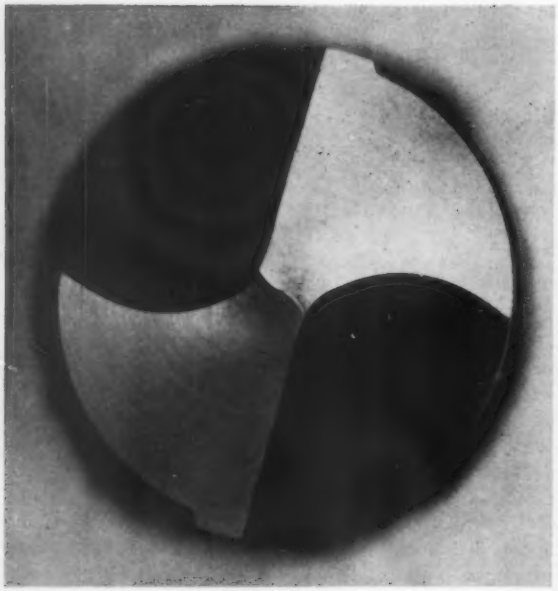


Fig. 1. Leading edge of spiral point drill has reversed curve

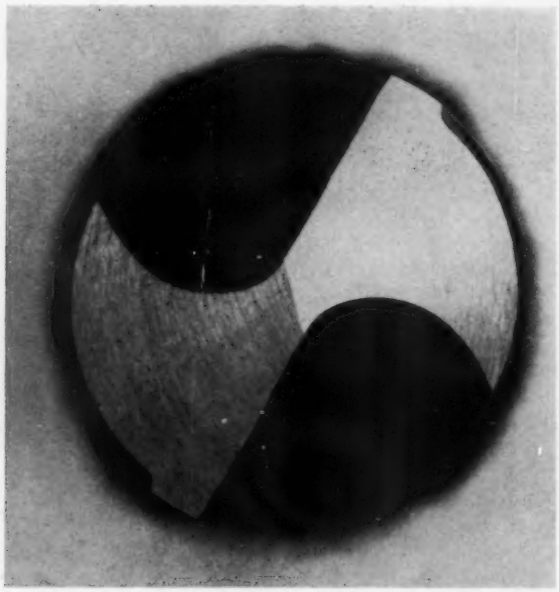


Fig. 2. This is a view of the conventional chisel point drill

Self-Centering Drill Point

Better Work Results from New Tool Geometry

By **HANS ERNST**, Director of Research, and
W. S. HAGGERTY, Supervisor of Research, The Cincinnati Milling Machine Co., Cincinnati, Ohio

IN RECENT YEARS, a great deal of work has been done in studying the performance of drills with respect to forces and flute shape and point angles, and other features of drill design. However, it seems to have been generally accepted that a drill should have a chisel point—perhaps because it has always had one, or because it was the easiest shape to grind. But, why use a chisel shape for a point? It isn't a point at all; it can't possibly give a centering action.

In practice, one end of the chisel edge is often slightly higher than the other due to small imperfections in symmetry of grinding. Hence, conventional drills usually tend to "walk" to one side or other of the desired hole location unless restrained by guide bushings or fixtures, or by the use of center-punched holes.

What can we do to give a true point—to give it an effective self-centering action, and a more efficient cutting action at the center? It is evident that the point shape itself must be changed. However, any proposed improvement in point shape can have general application only if it can be economically produced by some relatively simple manufacturing procedure. Hence a proposed point shape and its method of generation must be considered together.

Figure 1 gives an idea of the configuration which we have developed as a result of investigation. As indicated by the name "spiral point", the entire flank surface associated with each cutting edge is formed as a "three-dimensional spiral" surface extending from the axis of the drill to its periphery.

Because of the way in which these "spiroidal" surfaces are ground, the drill is formed with a true point and has a free cutting action close to the axis. The chisel edge is gone, and in its place is a characteristic "S-shaped" cutting edge.

Wherever the spiral point touches the work surface, it enters, and remains in that location; there is no tendency whatever to travel, or "crawl" to one side or other as in the case of the chisel point. It is therefore usually unnecessary to use center-punched holes or guide bushings to determine or maintain the proper location.

Because of the self-centering action, the holes produced with the spiral point drill are usually rounder, straighter, closer to the desired size and smoother than obtainable with the chisel point drill.

In order to make the spiral point of practical use, a machine is required which will grind this geometry accurately and economically. This machine is so designed that the drill is held stationary, while the generating system gyrates around it.

The extensive shop trials and laboratory tests conducted with the spiral point drill have produced results which indicate that this new drill point geometry constitutes a significant contribution to drilling practice, both from the viewpoint of improved quality and accuracy of holes, and higher production. With the Spiropoint grinder, this three-dimensional spiral form can now be generated on any type or make of drill at a cost no higher than that for producing the conventional chisel point. **End**

Design Data on Machine Foundations

Check-Off List Will Guide Your Planning

By F. JOHN EGGERT, Engineering Department, Lackawanna Plant, Bethlehem Steel Co.

WHEN YOU buy that new machine and find the assembly drawing furnished by the vendor illustrates the machine as setting on cloud No. 9, you begin to realize that you must tailor the machine foundation to your requirements. Engaging an outside engineering service is one solution. Another method used by many smaller manufacturers for simple foundations is the: "do-it-yourself-plan."

This article is intended to eliminate the common mistakes and oversights which are developed in a manufacturing plant when a new machine foundation is installed.

No doubt much thought and planning has been employed in determining the final location of the new machine in your plant to take full advantage of the superb engineering it affords. However, excessively long interruptions of production time in the new machine area of the shop often occur due to unforeseen situations.

Examples of such difficulties are typified by situations such as: insufficient overhead clearance for excavating equipment, trucking service must use the busiest aisle in your plant, and that partially excavated "dinosaur bone" turns out to be a dog leg in your main water supply line which is suddenly lifted. Such situations have a nasty way of creeping into the most efficient organizations.

As you know, a machine foundation is a mass, generally beneath the floor line. It is usually constructed of reinforced concrete and is installed to accomplish many functions: support the machine, anchor the machine, absorb or isolate vibration, collect and convey waste, protect conduit and other lines, contain auxiliary equipment, and provide a means of simplifying and speeding maintenance by providing basement access where required.

Experience shows that malfunctioning of foundations begins when afterthoughts such as: coping angles, ladder rungs, misplaced mounting bolts, elevation corrections, misplaced pipe sleeves, omitted pipe trenches and similar oversights require the services of a tailoring crew with air hammers after the form has been stripped.

Further difficulties can develop when water enters a box type foundation. Pumping and waterproofing are then applied and often include the addition of an automatic sump pump and an overhead drainage line. Leakage is often due to ignoring modern textbook authorities on concrete mixes. Therefore, it is well worth your time to determine your concrete mix requirements. Particular attention should be given to: density, water cement ratio, elimination of waterproofing by using a richer mixture, and the

FIG 1

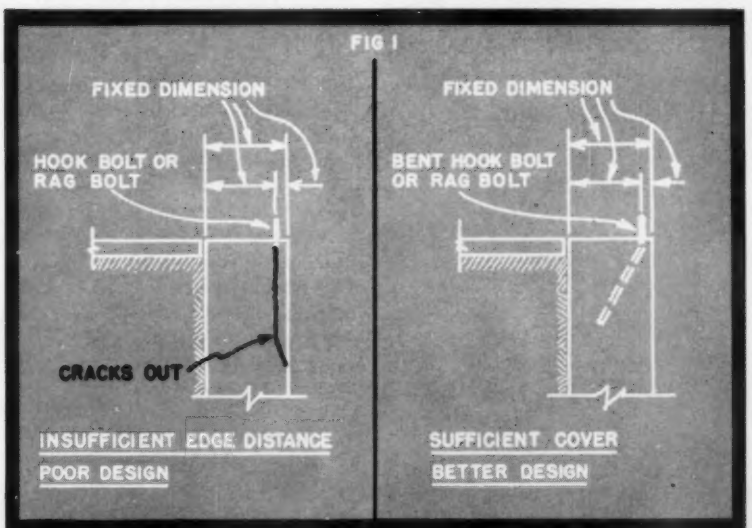
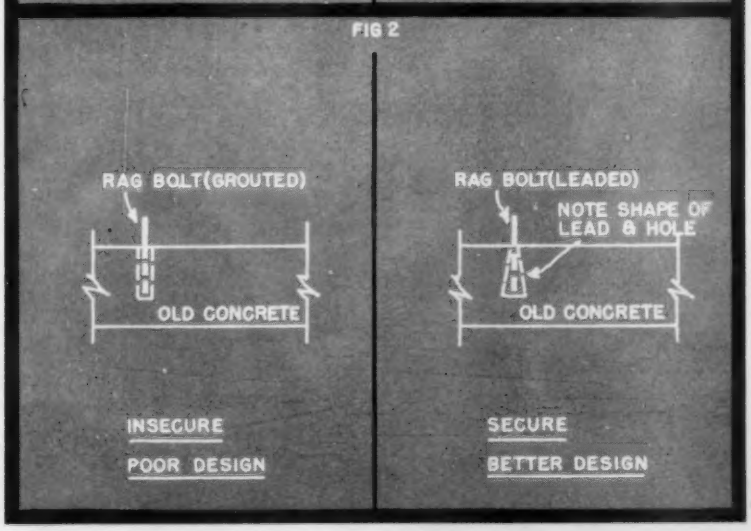
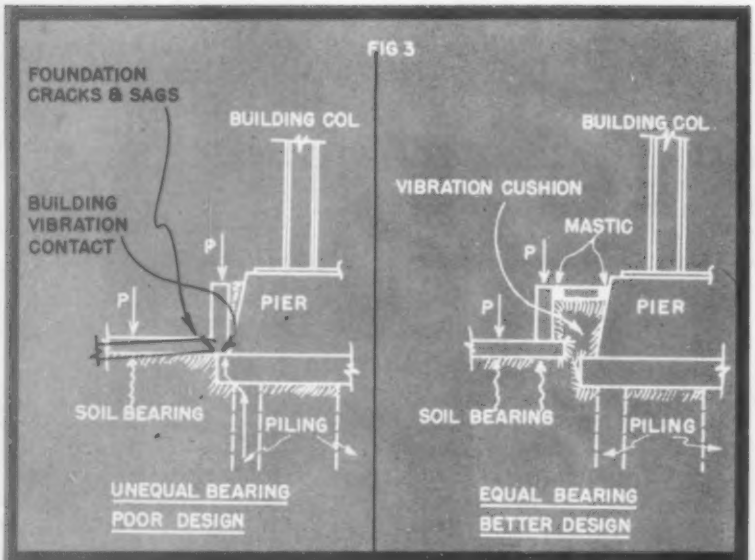
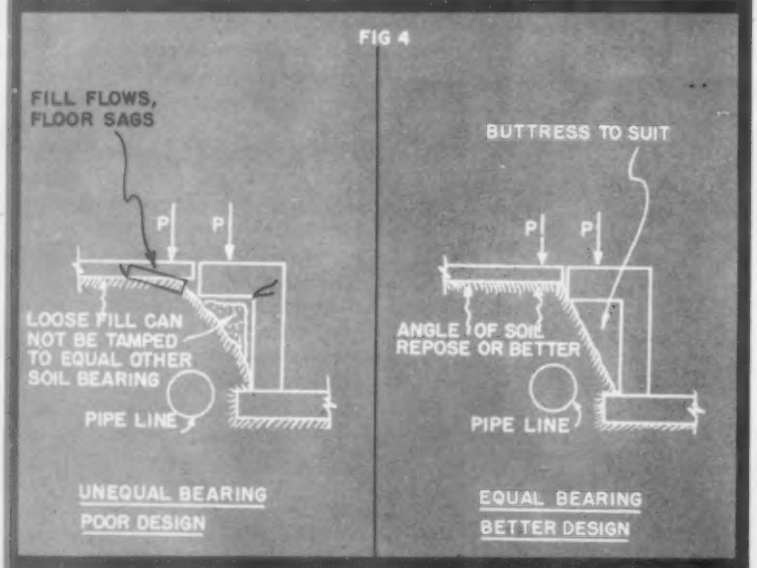
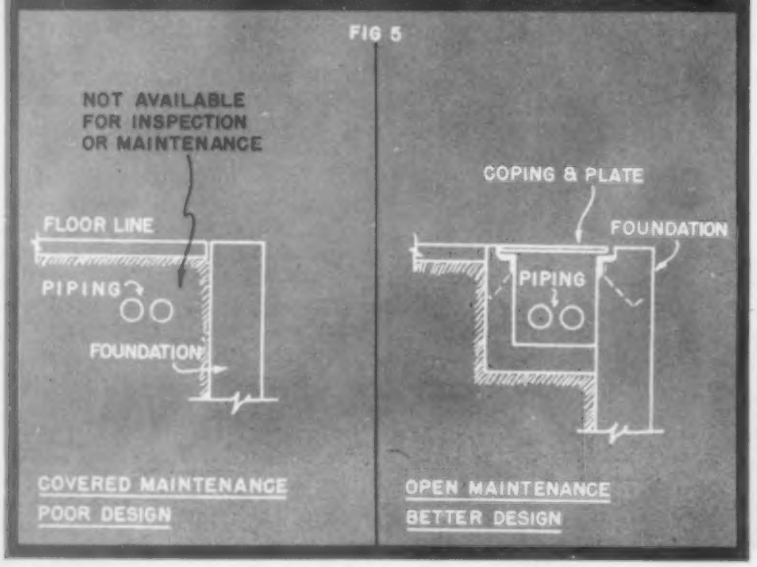


FIG 2









possible advantageous use of iron additives.

In estimating the amount of concrete for the job, be sure to include the absorption quantity when the concrete is poured onto the fill and losses from other sources to prevent the possibility of a short run. Requiring another half yard to complete a pour will put you in a spot. Of course, knowledge of the normal seasonal rise and fall of the water table beneath the shop floor is useful in scheduling the work to eliminate excessive shoring and pumping.

Settling of the foundation illustrates the fact that year-round soil bearing should have been previously determined to assure adequate mat spread or the use of piling. Oftentimes a good criterion of soil bearing can be determined by comparison. For example, your building design drawings of building column mat areas and developed column loads will indicate allowable soil bearing. This can be proven by a field check of the present building column bolt elevations against the original elevations. Of course, this theory does not apply when the building column piers bear on piling.

A further malfunctioning of the foundation is sometimes evidenced by erratic performance of the new machine due to lack of insulation from ground and/or floor vibrations developed by other equipment.

Check-Off List

Accordingly, the following check off list is submitted as a guide for your procedure.

1. Layout Drawing:—It should include installation parts for the new machine and:

a. Future expansion plans
b. Clearances
c. Stock size ranges
d. Stock supply
e. Product flow
f. Crane approach
g. Maintenance access
h. Power supply
j. Safety study
k. Underground conditions:

water, air, gas, phone, sewer, power and steam lines; abandoned foundations; water table; distance to rock; and type of earth.

2. Cost Estimate

3. Shop Superintendent Approval

4. Executive Approval:—It is assumed that your executive group

has approved the machine foundation installation on the basis of applicable details, including:

a. Process approval by state, building and sanitary codes.

b. Local building codes, drainage and sewerage permits, and smoke or air contamination regulations.

c. Utilities permits for fuel and power.

d. Fire Underwriters' requirements.

e. Insurance coverage for construction work—not just for production work.

f. Financing and tax matters.

g. Working arrangements with local labor unions.

Note: It is well to obtain approval in writing on the layout drawing from all concerned to jell plan and eliminate changes.

Check and Double Check

5. Field Check:—Consists of sufficient field trips to definitely establish the following items, and any other items, applicable to the job.

a. Existing floor elevation.

b. Crane approach.

c. Shop changes in equipment and structure not shown on existing drawings.

d. Temporary structures occupying new machine space and construction area such as stock bins, equipment storage and other items entering into clearing the site.

e. A bench mark to be used to establish the elevation of the new machine foundation since floor elevations often vary.

f. A datum line from which the new foundation will be positioned both ways.

g. Power supply routes and control locations.

h. Shop lighting changes.

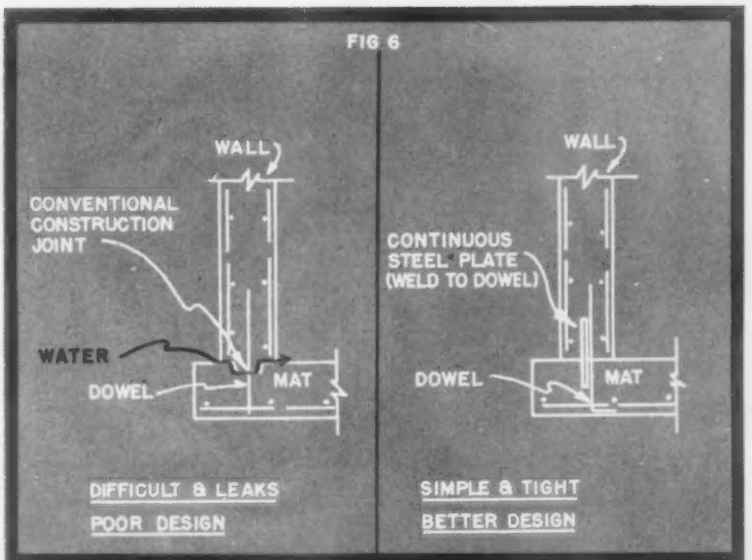
j. Chalk an outline of the new machine on the floor and sketch and tape dimensions between the new machine and other equipment and the building structure or other datum line. Add this information to the layout drawing.

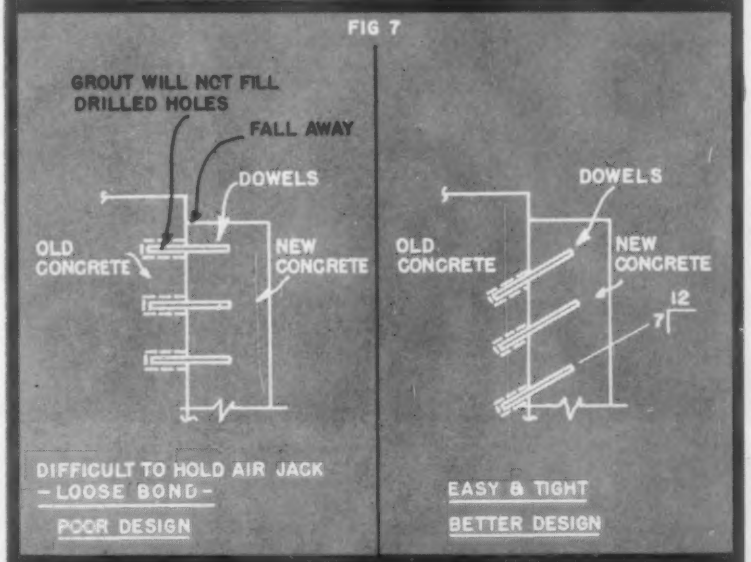
k. Temporary storage area for the new machine.

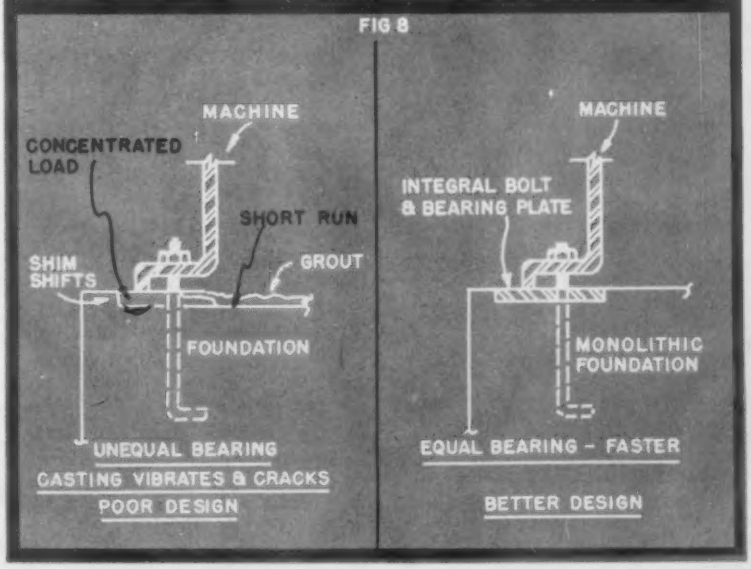
l. Floor area affected by foundation construction.

m. Equipment to be salvaged and equipment to be discarded in clearing the site. Disposition of such material.

n. Equipment and/or material to







be reinstalled such as floor blocks, etc.

o. Method of clearing site.

p. Construction, lighting and ventilation.

q. Availability of power (electric-air-steam).

r. Entrance and exit routes for materials.

s. Route overhead clearance, side clearance, turning radius, floor loads, protection for trenches, floor surfaces and valuable or dangerous equipment.

t. Storage area for outside contractor's construction equipment and materials.

u. Wording, size and color of route markers for outside truckers along with number and locations for both entrance and exit routes.

v. Capacities and availability of power equipment for hoisting, slings, rollers and other power.

w. Alternate means of continuing production in the construction area.

x. Personnel to sign for delivery of construction material prior to start of construction.

y. Safety hazards and precautions to be taken during construction.

z. (Something not listed.)

6. Vendor's Certified Prints:—new machine.

7. Arrangement Drawing:—Note: It is well to specify:

a. Field checks on concrete and control.

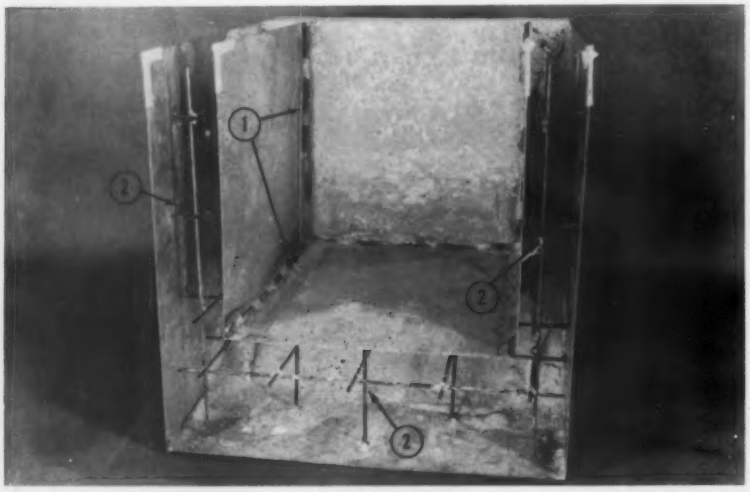
b. Minimum curing time before stripping.

c. Minimum time before applying load of machine, water or heat.

d. Quantity of prints and for whom.

8. Foundation Drawing:—Due to the fact that concrete structural design is discussed in many text books, such design problems and solutions are not discussed in this article. However, sixteen drawings are incorporated in the article to bridge some of the gap between text book methods and everyday reality.

One of the conventional types of formwork used in this country is the wooden form. However a foundation is often of such shape that the form must be extended or built up as the pouring progresses. This feature will require study.



Newer method of formwork consists of prefabricating entire form. Steel sheets with intermittent welds (1) become permanent part of foundation. Reinforcing rods (2) structurally support the form rather than the form supporting reinforcing rods

In addition to conforming to code requirements, holding to line and grade, being tight, strippable, etc., a form design must embody the element of speed. Therefore it follows that some thought should be given to the practicality of using prefabricated forms or sections.

Another conventional method is the removable steel section form consisting of multiple plates which are locked together and secured with ties and wedges. This method also must be studied.

A newer method of formwork consists of prefabricating the entire form (where practical, of course) using steel sheet which becomes a permanent part of the foundation. This form is unusual in that the reinforcing rods structurally support the form rather than the form supporting the reinforcing rods. The structural use of the rods in the form develops rigidity for handling and acts as ties and bracing while the concrete is poured.

This method permits complete installation of a foundation in one day rather than the usual week.

9. Excavation Drawing

10. Bill of Material:—Note: The bills of material should be explicit and practical in regard to whether certain items not specifically furnished by the machine vendor are to be purchased or manufactured in your shop. They should also clearly specify who does what and the proper sequence.

Estimating Time Required

11. Construction Scheduling:—Now that you know what and how you want to accomplish the installation of your foundation, it follows that you determine the time required to do it. The determining factors include the following:

a. Final cost estimate and allowance.

b. Starting and completion date.

c. Weather.

d. Delivery date of complete machine.

e. Clearing site.

f. Layout of base lines.

g. Excavating and trucking. (Capacities and time)

h. Shoring and pumping.

j. Cutting and positioning reinforcing rod in mat.

k. Forming, pouring and finishing mat.

l. Curing time of mat.

m. Constructing form, positioning reinforcing rods, pipe sleeves, anchor bolts, boxes, coping angle, ladder rungs, conduit and other lines.

n. Inspection and elevation checks before pouring. Better look twice.

o. Pouring and rodding—Quantities per pour, timing, form extension time, available man space and work time, chute lengths, moves required, approach distances and handling time.

p. Finishing and curing time.

q. Form stripping and other clean up work.

r. Backfilling, tamping and floor finishing repairs.

s. New machine positioning, levelling, grouting, bolting and erection. Connection test and acceptance. **End**

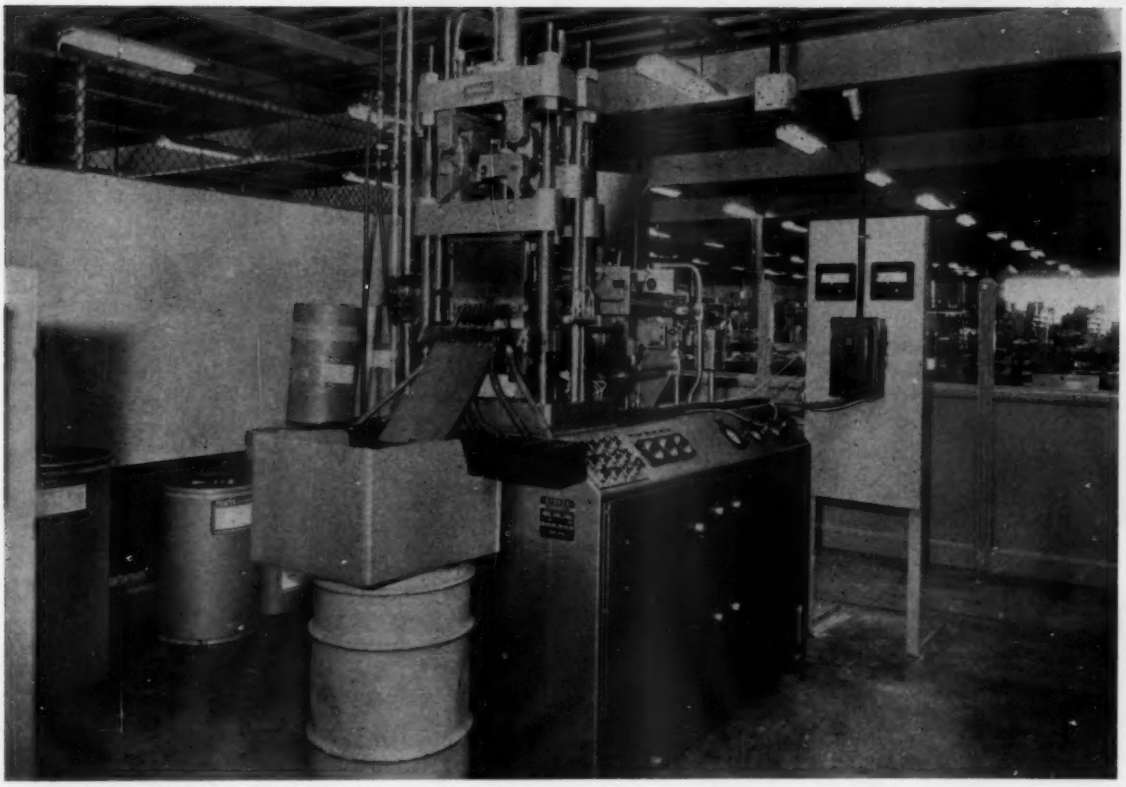


Fig. 1. Numbered keyboard inserts are molded and sorted automatically on this injection molding press in the Bristol, Va., plant of Monroe Calculating Machine Co. No labor is required except for keeping hopper filled, removing finished parts

Molding and Sorting—Automatically

NINE DIFFERENT numbered inserts, carrying the digits 1 through 9, are a highly important part of the calculating machines made by Monroe Calculating Machine Company, Inc. They are now molded automatically, separated from the sprues and runners, sorted automatically into the correct bins—all by means of an injection molding machine made by F. J. Stokes Corporation of Philadelphia. These machines are installed in plants in Bristol, Va., and Orange, N. J.

One of the plant guards turns on the heaters in the morning before the arrival of the first shift. The set-up man starts up the machine as soon as he arrives and checks periodically to see that the hopper is kept supplied with the molding material—Tenite butyrate. Operating virtually without attention these new presses have increased production 13 per cent and reduced manhours by 85 per cent. **End**

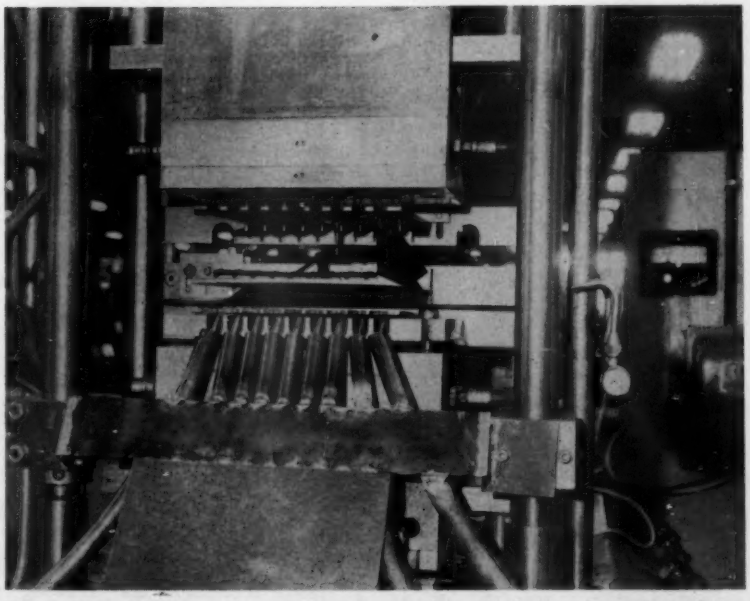


Fig. 2. This view shows the runners and sprue (arrow) about to be pushed off the die table onto the slide which carries them into the scrap bin. The nine different numbered inserts are pushed off into the tubes and thence into their separate bins

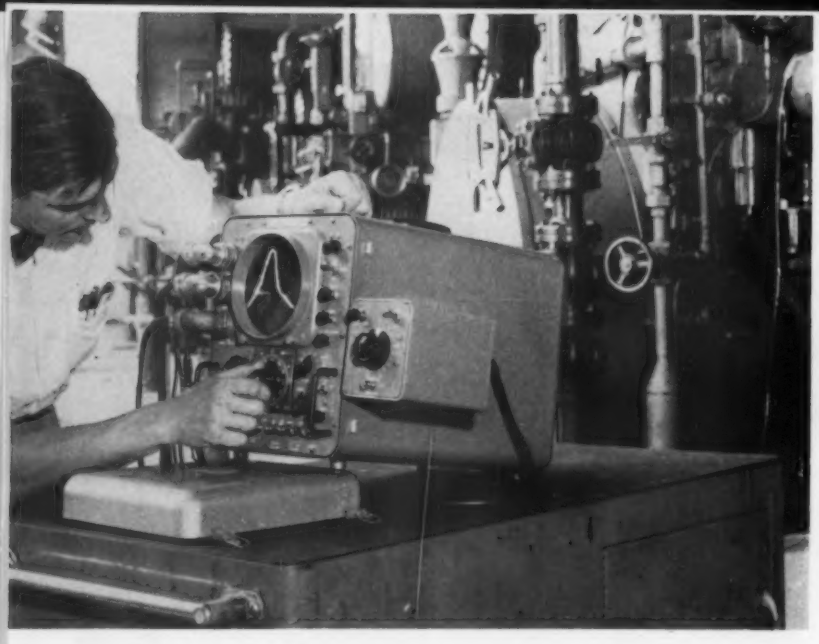


Fig. 1. Engineer E. A. Sammis runs through a complete "physical" on a natural gas engine. Using this new engine analyzer the diagnosis is made quickly, pinpointing malfunctions and trouble spots. The analyzer uses ignition, vibration and pressure data picked up by five connections to give a complete picture of the engine's operation

Engine Analyzer Cuts Maintenance Costs

A COMPLETE, cost-cutting look at the inner mechanical functioning of complex industrial engines — without expensive shutdowns — has been made possible by a new industrial engine analyzer.

The hand-portable, multi-purpose equipment displays pictorially the information formerly obtained from as many as three electronic instruments. It enables operators and maintenance men to monitor reciprocating engines — whether spark-ignited or diesel — to keep them operating at continuous peak efficiency. It also detects and pinpoints malfunctions as they develop within engines. It accurately monitors engine operation, providing three types of data: ignition, vibration and pressure.

Widespread use of the analyzer is expected throughout the natural gas, chemical, petrochemical and other industries where large reciprocating engines are used. Round-the-clock operation of as many as 12 such engines is common at a single natural gas pipeline pumping station.

Early tests of a prototype analyzer — which used only two (ignition and vibration) of the three types of data supplied by the advanced production equipment — proved its ability to save approximately $4,800 a month for an industrial plant using 80 natural gas engines, according to engineers of Sperry Gyroscope Co., manufacturers of the analyzer.

The analyzer, employing a highly specialized oscilloscope, probes the inner recesses of engines and presents functional information in picture form on a five-inch cathode ray screen.

The electronic data is transmitted from connections to the engine, through wires to the control unit, where it is transformed into pictorial information. It is attached and operated while an engine is running.

Simplicity of operation and easy interpretation of visual electronic patterns portrayed on the screen readily make it a line operator's "tool", as well as an engineering aid. A qualified operator, it is point-

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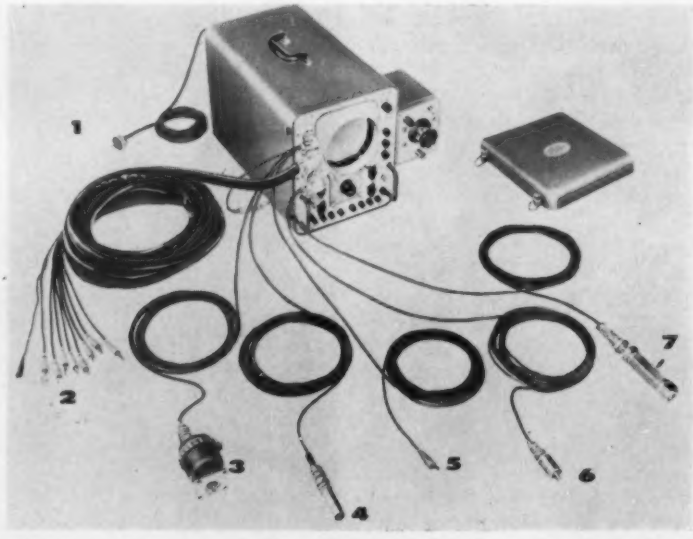


Fig. 2. Information from the engine is transmitted through wires to the control unit where it is translated into pictorial patterns on the cathode ray screen. Connections are: 1. Power connection which plugs into 115-volt alternating current; 2. Ignition signal; 3. Synchronizing generator; 4. Crankshaft timing pulse; 5. Alternate synchronizing; 6. Vibration; and 7. Pressure

Table I. Quick check list of commoner troubles of rubber rolls and recommended treatments. Details are given in article

Fault	Causes	Treatment
Hairline cracks	Fatigue, sustained overload, stored too long, improperly stored, too dry, exposed to sunlight.	Regrind, reduce load, possibly replace with larger, heavier, softer rolls.
Deep cracks	Frozen, exposed to ozone, hairline cracks were neglected.	Regrind below cracks if possible; otherwise roll must be re-covered.
Surface cracks near ends	Uneven pressure across roll, over-heating, swelling neglected.	Re-cover, correct localized pressure overload.
Swelling or mushrooming at ends	Hot bearings or rusted body surface at ends.	Correct lubrication; regrind or re-cover, cover end of metal body.
Ends of roll gouged or deformed	Damaged by sling chains in moving.	Protect ends when moving with chain sling; if possible use belt sling around middle.
Grooves or corrugations in roll	Sustained local overload, often from rope fabrics or narrow widths of material.	Use moving pin-rack, or change position of pin-rack weekly or daily.
Flat spot	Roll was left idle in contact with its mate; or was stored on its side.	Revolve in hot water for 1-2 hours. If not corrected, regrind. Don't leave idle rolls in contact. When storing rolls, support on journals.
Soil on light goods	Dirty roll, or oxidation from contact with brass roll.	Clean roll with alcohol or ethyl-free gasoline, but beware of fire hazard. If practicable, replace brass roll with other metal or with hard rubber roll.
Oxidation or case-hardening	Inactivity; long storage.	Regrind.

How To Take Care of Rubber Rolls

By DAVID A. KUNIHOLM, Rodney Hunt Machine Co., Orange, Mass.

RUBBER ROLLS worth millions of dollars are scrapped every year because of neglect. To avoid this unnecessary situation, two cardinal principles should be observed by plant management.

First, purchase rolls which are properly engineered for the work they are to perform and which are manufactured by experienced roll makers.

Second, make sure that the rolls in your plant have a definite place on your maintenance program. Service records should show the date received, the date placed in operation, the date reground, etc.

Soft rolls require more attention than hard rolls and should be inspected daily for punctures, scratches and cuts. These, if neglected, will become deep and serious. A weekly inspection should be sufficient to detect any tiny hairline fatigue cracks.

Grooves which may be produced by excessive passage of textiles in rope form through the same parts of the roll can be avoided by frequently changing the contact position along the roll. Overloading is another practice which should be avoided since it fatigues the roll prematurely and rarely gains in extra production what it costs for replacement. If more pressure is required, new and larger diameter rolls will pay off in longer life and better production.

Bearings should be lubricated carefully to avoid overheating and consequent splitting or mushrooming of the covering at the ends. However, they should not be overlubricated since excess oil may spill over on the rubber covering and cause damage to the surface. Also, rolls should be cleaned with alcohol or ethyl-free gasoline which evaporates quickly. Petroleum in any form, especially kerosene, is injurious to rubber. But no smoking please! If rolls are frequently wet with oils, they should be washed once a week with water or strong soap and then rinsed well.

Pressure must be kept uniform at both ends of the roll to avoid uneven wear and cracking of the covering. Idle rolls should have all pressure on them released and should be removed from contact with the mating roll to avoid a flat spot at the standing nip. If, through negligence, a flat spot has developed, revolving the roll for two hours in hot water can sometimes remove it. If not, the roll must be reground.

Wear in the middle of the roll resulting from running open width

Fig. 1. Do not permit rubber rolls to become wet with lubricating oils or other forms of petroleum. If this should happen, however, clean rolls immediately with alcohol or ethyl-free gasoline. If rolls are frequently wet with oils, wash once a week with water and strong soap and rinse well. Rolls should be flushed clean of resins, starches, gums (and other viscous compounds that tend to build up on surfaces) while these products are still in a soluble state. Attempts to remove adhesions of this type of material after they have set might injure roll surface

material cannot be compensated for by increasing the pressure. The only compensatory measures possible are to regrind the surface or to regrind and bevel down $\frac{1}{16}$ to $\frac{1}{8}$ in. for one inch from the end of the roll to provide a rounded end.

Avoid all direct contact of rubber rolls with brass rolls. Brass provokes oxidation of the rubber which may cause the soiling of light colored materials. Substitute, instead, a hard rubber, stainless steel or chromium-plated roll.

When a roll must be moved from place to place, the recommended method is to place a broad belt sling around the middle of the roll. If end slings are used, the ends of the roll should be protected with blocks or covers to prevent chains or ropes from fouling the ends.

Rolls in storage should be supported on the shaft, preferably in the original shipping case. Keep rolls wrapped in heavy kraft paper, as they are delivered. If possible, rotate rolls in storage 180 deg once a week. Store them in a cool, dark, damp spot where the temperature is 50 F to 60 F. Rolls should also be kept away from electrical appliances, especially motors that generate ozone, which is injurious to rubber.

When rolls are restored to service after storage, they should be reground to remove the film of oxidation from the surface. This is imperative if they have been stored for six months or more and is recommended in any case. A tabulation of the most common ills of rubber rolls, along with recommended treatments, is given in Table I.

Fig. 2. Inspect rolls daily for punctures, scratches and cuts. It is best to avoid attempting repairs with cements and self-vulcanizing rubber. If the damage is too severe to be corrected by grinding, a crude repair is likely to damage the goods in process. Hairline cracks, a symptom of permanent fatigue, can be corrected. If reground at once the roll will present a fresh, resilient surface to the work. Neglected, they will become corrugations or deep cracks. Note that pressure has been released from the rolls shown in this photo. While rolls are idle, contact between mating surfaces should be avoided; otherwise they will acquire a set

When Rolls Require Regrinding

Regrinding restores a rubber roll to its original roundness, straightness, contour, and capacity for the work it was engineered to do. Regrinding is needed when the original surface has worn unevenly or has suffered minor or accidental damage or developed hairline cracks.

Regrinding is also required when the roll has been idle in storage or when the roll surface — especially that of an old roll—has developed a slight case-hardening or density change due to aging. These conditions apply especially to squeeze rolls of soft rubber; rarely to idler rolls of hard rubber.

Frequent regrindings on a well scheduled maintenance program add to the total service life of a rubber roll and produce a fresh new surface which restores original efficiency. To grind a little at frequent intervals is better than grinding heavily at longer intervals.

Modern grinding equipment produces roll surfaces of remarkable

precision, whether straight or crowned. This equipment, however, is rarely found in the plants of roll users, but only in those of roll makers. The user of rolls who does not return his rolls to the makers for regrinding must generally rely on a machine lathe with a motor-driven grinding attachment. This equipment will produce reasonably satisfactory results in refinishing straight surface rolls.

To be sure, perfect results depend on the interest of the operators; he must learn how to handle rubber just as he learns to handle metal. Crude repairs by an unskilled workman, however, should be avoided. They may ruin the roll or damage the goods in process.

First consideration is the rigidity of the machine. It is impossible to do a first-class grinding job unless the grinding unit is rigidly mounted. A one- to two-horsepower motor should provide sufficient power. The grinding wheel should be 10 to 12 in. in diameter with a 1-in. wide face and of reasonably coarse grain to prevent loading the wheel. Speed of the grinding wheel should be 2500 to 3000 rpm, following the recommendations of the wheel manufacturer.

Grinding wheel and roll should both rotate in the same direction so that the surfaces at the grinding point will be traveling in opposite directions. The roll should revolve at about 125 surface feet per minute for rolls of medium or hard density. Lower speeds may be required for softer rolls. Chatter marks indicate that the roll speed is too high.

Rubber rolls should always be ground dry, and if possible should be run on their own journals if the conventional lathe back-rests are available. If not, they may be run on shaft centers. In this case it is necessary to check the shafts by indicator to be sure that the bearing surfaces run true with the centers. Roll axis and grinding wheel axis should be in line.

The first cut should be a roughing cut—not over 1/32 in.—to take off surface irregularities. Length of cut, travel speed of the tool-post, and speed of the roll may indicate a cut well under the maximum quoted. This depends somewhat on

(Continued on page 228)

Fig. 3. It is advisable to keep records on rolls showing date received, date in service, date of regrinds, etc. Records should be a veritable diary of each roll's service life. When moving a roll from machine to storage, keep a record of the change. Rolls in storage should be supported on the shaft, never on the roll body or standing on end. One of the best storage places is the shipping case in which they were delivered by the manufacturer because this is fitted with supports for the shaft. Rolls should be wrapped in heavy kraft paper as they are delivered. If convenient it is desirable to rotate rolls in storage once a week

Table II. Specifications and manufacturers of good all-purpose grinding wheels

Grinding Wheel Specifications	Manufacturer
GC 363 L16-V62	Cincinnati Milling Machine Co.
RC 36 L6-B	Carborundum Company
302-S14-XK152	Raybestos-Manhattan, Inc.
30-S15-KLM	Raybestos-Manhattan, Inc.
A 24-05VBE	Norton Company
A 60-M5VBE	Norton Company
C 724-K4-BL	Atlantic Abrasive Corp.

Fig. 4. In this mill, good care begins with good handling practice. Rolls are stored in original shipping cases which are tiered in steel racks. Rolls rest on journals preventing deformation or surface damage as a result of prolonged storage periods

Fig. 1. Telephone operator, Sally Mulhearn, presses selector button that transmits an alerting tone to a particular paging receiver. She then delivers a voice message over desk microphone

Paging Maintenance

Radio Pager Contacts Key Personnel Anywhere in the Plant

By SIDNEY BERGER, Berger Machine Products, Inc., Maspeth, N. Y.

AFTER YEARS OF trying to overcome the problem of paging people above machine shop noise levels, we were strongly attracted to a new concept in paging systems —the radio pocket pager. Its first year of operation is now history. It is a welcome improvement over our former paging methods.

Since we manufacture steel tubing, our machine shop operations are quite noisy. Because of the noise, it has been extremely difficult to page, or to get in touch with maintenance personnel, plant management men and sales people who are working throughout our extensive plant areas.

Our plant consists of two multistory buildings with storage areas adjacent to the buildings and interconnecting passageways between them. In addition, our basements are used for storage of sheet steel coils. wire and other material.

This area, comprising about 200,000 sq ft, is now fully covered by a Motorola Radio Pocket Paging System. Never before have we been able to contact key men—almost instantly—anywhere in the plant area.

Our new paging system is presently operating with 18 paging receivers. In use, a pager is clipped to the user's pocket or belt. These units receive messages from the switchboard operator.

The operator has her pager selector console near the switchboard. To contact the desired person, she presses the proper numbered selector button, then speaks the message into a desk microphone. Only the called party hears the alerting tone and the voice message which follows.

Receiver operation is equally simple. The called party hears a "buzz" indicating there is a call for him. He presses the button on top of the unit to receive his message. As the pager receives a voice message directly from the operator, there is no need to go to a telephone, unless the message indicates a telephone call is waiting.

Essentially, our paging system is similar to a low-powered radio network. It requires no Federal Communications Commission license to operate, yet it provides complete coverage of our buildings and grounds. The installation of equipment was accomplished without the need of antenna structures or building remodeling. Antenna loops were in-

stalled inconspicuously in the buildings and in the basement. FM radio equipment, installed in a neat cabinet, takes little space.

As soon as the system went to work, the improvement in interplant communication was almost unbelievable. In the months that followed, plant efficiency increased.

Plant and machine maintenance has never been better. Whenever a maintenance man is needed, he generally is needed in a hurry. With the pager in his pocket or on his belt, he is always close to his "buzzer." No matter where he is, the telephone operator can contact him and relay pertinent information. With the old system, often he didn't hear or respond to his page until it was repeated several times, and even then, he had to leave what he was doing to check back by telephone.

We find that when maintenance and repair is prompt, valuable time is saved all around. At the first indication of equipment difficulty, the operator can quickly obtain aid. In some cases, this quick action prevents more serious consequences. Naturally, in cases of power failures, prompt service cuts equipment downtime to a minimum. All in all, we find that time now saved in maintenance and repair operations adds up to a substantial sum on the right side of the profit and loss sheet.

Another plus in radio paging is the between-building and in-basement contact. As the whole area is effectively covered by the low power radio signals, persons travelling in and around these usually hard-to-contact locations can be paged.

Customer service has also showed a marked improvement. A customer telephoning about his order is now quickly put in touch with the right man.

The system has definitely reduced the number of call-backs formerly required. In cases where time is important concerning a customer's job in process, or on a new order, our present immediate pager contact is invaluable.

Although the paging system is restricted to key personnel, everyone shares its benefits. It has eliminated the use of bells and loudspeakers. It makes possible better telephone service, which reflects in higher efficiency through faster interplant communications. **End**

Fig. 2. Company chief electrician, Louis Antico, has a paging receiver attached to his belt. The system has increased effectiveness of daily maintenance chores

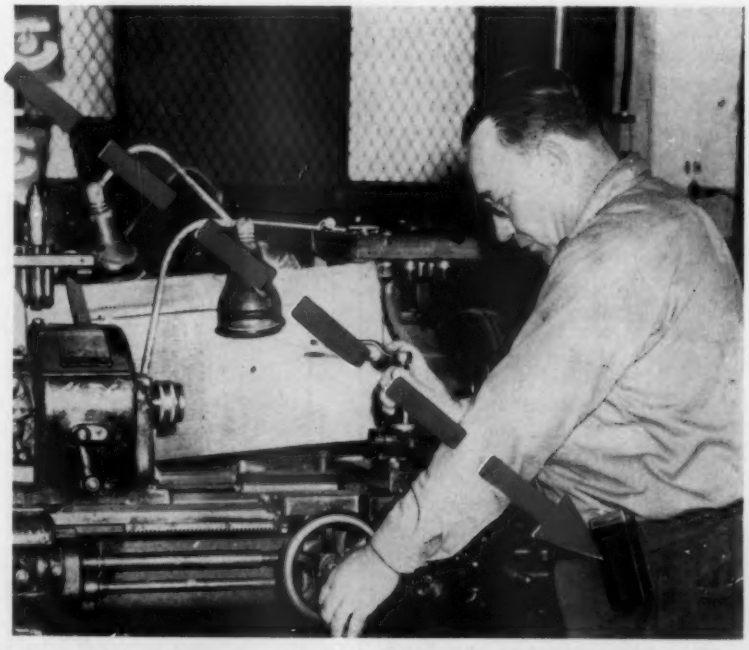


Fig. 3. Maintenance superintendent, Gus Weising, adjusts one of the metal working lathes. His receiver allows him to receive job orders wherever he is working

The "ins and outs" of taxation as applied to plant machinery and equipment can be confusing . . . However, the plant engineer who is familiar with the basic concepts presented here can answer the questions: How much has it depreciated? . . . If I repair it instead of replacing it, do I get any tax benefit? . . . Should I use the old equipment as a trade-in? . . . Should I lease or buy?

An Assist for the Plant Engineer—

Figuring Taxes on Productive Assets

By ELI GERVER, Dir. of Taxation, American Institute of Certified Public Accountants

TAXES PLAY an important role in business today. It is not wise to take steps solely on the basis of tax effects, but these effects must be carefully considered. In planning repairs, replacements, improvements, alterations, and other aspects of plant operation, taxes are as important a factor in making decisions as in the more publicized aspects of the financial world.

One major factor in computing income, the recognition of depreciation, is of comparatively recent development. Assets used in production deteriorate with use and the passing of time. Obsolescence of existing facilities results from the development of new techniques and new products. No matter how the loss of usefulness occurs, the investment in productive assets is inevitably lost by the "irresistible march to the junk heap." Income and *taxes based on income* cannot be properly computed without allocating to each year a portion of the cost of the assets used in production.

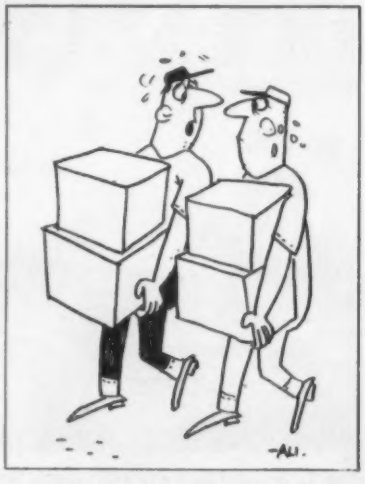
Depreciation in the accounting sense has a meaning somewhat different from that in the engineering field. The committee on terminology of the American Institute of Certified Public Accountants has discussed this difference:

> " . . . the accounting concept is one of systematic amortization of cost . . . over the period of useful life, while the engineering approach is one of evaluating current usefulness."

This difference in approach is evidenced primarily in problems of appraisal and in the determination of rate bases for public utilities. For federal income tax purposes, depreciation is considered in the accounting sense; that is, the cost of assets is distributed over a period of years.

Depreciation for Tax Purposes

The Internal Revenue Code permits a reasonable deduction for income tax purposes to allow for the depreciation of property used in a trade or business. No deduction is allowed for the depreciation of land or of inventories. Although the deduction is generally limited to tangible property, intangibles with a limited useful life may also be depreciated. For example, after 17 years a patent expires and frequently its usefulness will be gone some time before that. The cost of a patent may be depreciated.



"What happened to automation?"

We said above that the cost of the asset is distributed over a period of years. In making determinations of depreciation, the taxpayer must also take into account *salvage value*. This is the amount which it is estimated will be realized when the asset will no longer be useful to the taxpayer and he sells it or otherwise disposes of it.

The amount that is distributed over a period of years is not the original cost but that cost reduced by the salvage value. The period of years to be used is termed the *estimated useful life*. For tax purposes this is not the useful life inherent in the asset but the period for which the taxpayer expects to use the asset. This period generally determined by reference to the taxpayer's experience, present conditions, and anticipated developments.

Some of the factors which are considered are progress in the industry, wear and tear resulting from use, climate and other local conditions, and the taxpayer's policies as to repairs and replacements. You can readily see that, dependent on the taxpayer's policies, salvage value may range from scrap to a relatively high proportion of the original cost.

In estimating useful life, an important guide is the Treasury Department's Bulletin F. This bulletin, last revised in 1942, lists estimated useful lives for various assets used in trade or business. The bulletin is presently undergoing a revision to take into account the tremendous technological advances made since 1942.

We know the amount to distrib-

ute and we know the period over which to distribute. As to the manner of distribution, there is a fairly wide choice. The Internal Revenue Code permits considerable latitude in this respect, and a brief description of the more popular methods will be useful.

Depreciation Methods

The *straight line* method is the simplest and probably the best known. The cost of the asset less salvage value is distributed over the estimated useful life in equal annual amounts. Thus, an asset with a cost of $1000, salvage value of $100, and a useful life of five years would be depreciated $180 a year. (This is at a rate of one-fifth or 20 per cent each year.)

The *declining balance* method permits a more rapid recovery of the cost in the early years of useful life. Under this method, a uniform percentage rate is applied each year to the undepreciated cost of the asset. The percentage used may not exceed twice the straight line rate. Salvage values are not considered, but the total depreciation deducted over the life of the asset may not exceed cost less salvage value.

Under the declining balance method, the asset described above would be depreciated at the rate of 40 per cent (twice the straight line rate of 20 per cent for a five year life). The first year's depreciation would be $400 (40 per cent of $1,000); the second year's depreciation would be $240 (40 per cent of $600, the undepreciated cost). However, the total depreciation claimed on this asset could not exceed $900 (original cost less salvage value).

The sum of the years-digits method also permits a more rapid recovery in the early years of useful life. Depreciation is computed by applying a fraction to the cost less salvage value. The numerator of the fraction is the number of years of useful life remaining and the denominator is the sum of the years digits corresponding to the estimated useful life.

Thus, in our example of the five-year asset, the denominator would be 15 (1+2+3+4+5). For the first year, depreciation would be $300 (5/15 of $900); for the second year, $240 (4/15 of $900).

For purposes of comparison, see Table 1 showing each year's depreciation under these three methods on an asset costing $1,000, salvage value of $100, and an estimated useful life of five years.

These three methods are specifically authorized by law. Other methods may also be used. For example, depreciation may be based on the estimated number of units equipment will produce, or the number of hours a machine will work. Considerable latitude is permitted in the selection of a method. If the proper accounting records are maintained, different methods may be used on different assets. You can even change from declining balance to straight line at any time you wish. Other changes in method may be made if permission is received from the Commissioner of Internal Revenue.

The declining balance and sum of the years-digits methods may only be used on tangible property with a useful life to the taxpayer of at least three years. The taxpayer must be the original user of the property and the property must have been acquired after December 31, 1953. Thus, a savings in price by purchase of second-hand equipment may be offset by the inability to use a rapid depreciation method.

It should be realized that there is no single correct method. Even though the income will differ greatly, depending on the method used, each method is equally acceptable as a means of computing depreciation charges.

Those methods which permit a greater recovery of cost in the early years do so only by giving a smaller deduction in later years. Thus, there is a deferral of tax. By acquiring new assets every year, this deferral can be continued. This deferral, even if only temporary, saves taxes immediately and provides additional funds for self-financing.

On the other hand, the deferral of the tax may be considered undesirable. The deduction for depreciation may be more useful in later years against increased income. Thus, a company with low earnings today but anticipating better times might prefer to use the straight line method of depreciation.

Leasehold Improvements

Where the property in question consists of improvements to leased property, different rules are applicable. The estimated useful life of the improvement is tied to the term of the lease. For example, a building with an estimated useful life of 25 years is erected on land leased for 20 years. Requiring the taxpayer to depreciate the building for 25 years would not be fair since at the end of 20 years the lease expires and he no longer has the building. The taxpayer-lessee in such a case is permitted to amortize the cost of the building over the term of the lease. This is not depreciation (although the principles are the same), and none of the rapid methods of depreciation may be used.

On the other hand, if the building has a useful life of 20 years or less, then its cost may be depreciated over the estimated useful life without regard to the term of the lease. Thus, it is important to consider the relation between the lease term and the useful life of the improvement.

While rapid depreciation may not be used where the asset has a greater life, cost is recovered fairly soon by the use of the lease term as useful life. The committee on federal taxation of the American Institute of Certified Public Accountants has suggested elimination of the distinction and permitting the use of rapid depreciation regardless of the term of the lease.

Another problem exists where the lease is subject to an option to re-

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A Certified Public Accountant, he graduated *cum laude* from The City College of New York and is currently teaching a course in taxation. He holds a Master of Law degree from New York University.

During World War II he served with the U. S. Army in the Infantry and in the Finance Department.

Mr. Gerver has had eight years' experience with public accounting firms, and is a member of the New York State Society of CPA's.

new. Under present law, if it is reasonably certain that the lease will be renewed, the term of the lease includes the renewal period. Thus, if the building with a 25-year life were erected on land with a 20-year lease and it was certain that the lease would be renewed for a 10-year term, then the useful life of the building is less than the term of the lease (30 years, 20+10 years renewal). Accordingly, rapid depreciation may be used.

Repairs and Replacements

New equipment cannot be charged off as an expense in the year of acquisition but must be depreciated along the lines discussed above. A problem arises, however, when existing assets are repaired. Generally, the costs of repairs to keep assets in an efficient operating condition are deductible for income tax purposes. A distinction must be made between expenditures which are additions to the capital investment and those which are for maintenance.

Repairs do not add to the value of the assets nor do they appreciably prolong their life. They merely keep the assets operating over the probable useful life for the uses for which the assets were acquired.

Replacements, alterations, and improvements, on the other hand, prolong the useful life, increase values, and may make assets adaptable for other uses. These expenditures may not be charged to expense immediately. Their cost may be recouped only through depreciation deductions.

Frequently repairs and improvements are undertaken at the same time. Occasionally, taxpayers have lost the immediate deduction for repairs because they were unable to show the exact cost of the repairs. *It is important that detailed breakdowns be kept* in order to substantiate tax deductions. In addition, some taxpayers have been required to depreciate repairs where included in a general over-all plan of improvement.

For this reason, it may be preferable not to undertake repairs at the time of a general overhaul if it is important that the repairs be deducted immediately. While repairs need not be depreciated merely because included in the general plan, the plan plus the factors of reconditioning, alteration, prolongation of life, and increase in value will usually result in no immediate deduction for the repairs. It must be emphasized that this deduction is not lost but is taken over the future years as depreciation.

Of course, in substantiating any deduction, it is necessary to have bills for the work done. The bill should describe the nature of the repair so that it is clear that the work is primarily maintenance and not an improvement.

Table 1. Comparison of three methods of asset depreciation over five-year period

Year	Straight Line	Declining Dollars Balance	Sum of the Years-Digits
1	180	400	300
1	180	240	240
2	180	144	180
3	180	86.40	120
4	180	29.60	60
5	900	900.00	900

Renting vs Buying Equipment

When equipment is purchased, a substantial investment of funds is required. This investment can only be charged to expense over a period of time. Occasionally, this makes it more desirable to rent the equipment instead of purchasing it outright. The investment is minimized and the annual rental is deductible. Of course, the immediate financial advantage in renting can be offset considerably by the right to use rapid depreciation methods.

Care must be taken when property is rented. Rental contracts frequently give the lessee the right to apply his payments against a purchase price. What may happen is that the payments of rent will not be deductible but will be treated as installment payments on a purchase. In that case, the cost will have to be recovered by depreciation. Possibly some of the current payments will be deductible as interest on an obligation. Although the deduction is not lost, the timing of the deduction is substantially changed.

Whether a contract is one of rental or sale depends on the intent of the parties as is shown by the contracts in the light of the surrounding circumstances. There are no hard and fast rules and each case should be considered individually. The Internal Revenue Service has indicated they will consider the contract to be one of purchase rather than rent when *any* of the following factors exist—parts of the payment are applicable to equity to be acquired by lessee; title passes after a number of payments are made; the rent for a relatively short period is high in contrast with the purchase price; the rental exceeds the "fair rental value"; title may be acquired upon the payment of a relatively nominal option price; part of the payments may be designated as interest. (Incidentally, some courts have found an option price to be "nominal" where the price ranged from 9 per cent to 23 per cent of the aggregate rentals.)

When the time has come to replace equipment, the problem arises of what to do with the old assets. A solution requires careful planning.

To begin with, we must know the tax cost of the equipment being replaced. This would be its original cost less depreciation to date. In making this determination, an allowance for depreciation must be considered for every year the asset has been owned. The total adjustment will usually be the same as the total amount deducted during the time the asset was owned.

If the asset is sold at a loss (based on the tax cost), then the loss is fully deductible. If the asset has been held more than six months and is sold at a gain, the gain is taxed as a long-term capital gain which means at a rate no higher than 25 per cent. If the asset is held less than six months, the gain is ordinary income which can be taxed at a rate as high as 52 per cent for a corporation, or 91 per cent in the case of other taxpayers.

Where several depreciable assets, which have been held for more than six months, are sold in the same

year, then the gains and losses on the transactions are offset. If there is a net gain, it is a long-term capital gain. If there is a net loss, the loss is fully deductible. Thus, it may be advantageous to make certain sales resulting in a gain in one year and making loss sales in another.

Actually, you may be better off using the old asset as a trade-in. On a trade-in there is no taxable gain or loss. Thus, if there would be a gain by trading the property, a tax may be avoided. On the other hand, if a loss would be incurred, you may be better off selling the property and obtaining a loss deduction.

When old equipment is traded, the gain or loss is reflected in the tax cost of the new property. Assume an asset with a tax cost of $1000 but with a trade-in value of $1500, is used to acquire a new asset costing $5000 (including the trade-in). You pay with cash of $3500 ($5000 less $1500) plus property carried on your books at $1000. The cost of the new machine, therefore, is $4500 and future computations of depreciation are based on that cost.

Since the tax on a gain will not be greater than 25 per cent, it may be advantageous to sell the property, pay the tax, and buy the new equipment without a trade-in. The higher cost will be recouped through depreciation which can be deducted at rates quite possibly higher than 25 per cent.

Assume our old machine were sold for $1500. The gain of $500 would be taxed at 25 per cent, leaving net proceeds of $1375. The additional cash required would be $3625 and our tax cost is $5000. By the use of a rapid depreciation method, a substantial part of our cost will be recovered in the early years of use of the new asset.

Retiring Assets from Use

When assets are retired from use but not sold, the question arises whether there may be a deduction claimed. Generally, if the retirement is normal, in the sense that it occurs at the end of the asset's estimated useful life, no further deduction may be claimed until the asset is sold. This is logical since at that time the asset has been presumably depreciated to salvage value and there is no cost which may be further depreciated.

On the other hand, if an asset is retired before its time, a loss deduction may be claimed for the undepreciated portion of the asset's cost. The abnormal retirement may result from damage by a casualty or possibly from obsolescence.

Retired assets may be sold as second-hand equipment, or possibly scrap. The disposition is subject to the rules discussed above. Until there is a sale, however, there will be no gain to be reported.

Where the taxpayer acquires land with a building and then razes the building in order to erect a new building, he will not be permitted to deduct that part of the price paid which was for the old building. Nor will the demolition costs be deductible. It is assumed that the cost of the cleared land is the price paid for the land and building plus the removal costs.

Inflation Effects

Prior to the passage of the Internal Revenue Code of 1954, depreciation methods were not as liberal. The declining balance method could be used but only up to 150 per cent of the straight line rate. The liberalization of depreciation was intended as an economic incentive.

Some people feel that even this is not enough to compensate for the effects of inflation. The effect of price level increases makes any depreciation policy based on original cost unrealistic in that it will not permit the accumulation of sufficient funds to replace depreciated assets at future higher prices. In order to protect its capital, a taxpayer should recover each year a sufficient amount in terms of current purchasing power to equal the year's depreciation in terms of original cost.

On the other hand, the practical problems of measuring the effect of price level changes as to various assets, make a departure from depreciation based on cost nearly impossible. Furthermore, the economic wisdom of such a move is questioned. Discussing this problem from the viewpoint of financial statements, the AICPA committee on accounting procedure said:

> ". . . accounting and financial reporting for general use will best serve their purposes by adhering to the generally accepted concept of depreciation on cost, at least until the dollar is stabilized at some level.
>
> ". . . consideration of radical changes in accepted accounting procedure should not be undertaken, at least until a stable price level would make it practicable for business as a whole to make the change at the same time."

At this time, it does not appear likely that the tax laws will be amended to permit depreciation to be computed on anything other than original cost. **End**

"I'm going to leave some literature with you on quenching."

Saturable Reactors Beat the Heat

Eliminate Contactors for Precise Furnace Control

Basically an amplifier, saturable reactor control devices, operating with no moving parts, use a few watts of d-c current to accurately control many kilowatts of a-c current

By H. M. EVERSZ, Plant Engineer, McCulloch Motors Corp., Los Angeles, Calif.

SATURABLE REACTORS or magnetic amplifiers are relatively simple devices, but generally must be tailored for a specific function. They consist of a rather conventional a-c transformer with a metallic core and a d-c coil superimposed on the windings.

Current flowing through this superimposed d-c winding has a tremendous impact on the flux density in the metallic core and a similar impact on the amount of a-c current the transformer will deliver. In fact, this impact on core flux density and the amount of a-c current delivered is so great that the ratio of d-c to a-c current in a saturable reactor can be as great as 1:1200.

Advantage of the saturable reactor in furnace control, Fig. 1, is that in conjunction with proper furnace instrumentation, it becomes a constant sensing device. No variation in furnace temperature is required to operate it. With furnace instrumentation furnishing a constant current to the d-c coil in the reactor, the flow of a-c current to the furnace is also constant.

This is much better than contact sensing, Fig. 2, which is literally a "feast or famine" proposition. In contact sensing, either full power or no power is being fed to the furnace.

There has to be some up and down fluctuations in furnace temperature to cause the contacts to open or close as the case may be. This up and down temperature variation is even greater than it should be theoretically, because the contact sensing mechanism is not instantaneous in operation. When furnace thermal inertia time is quite long,

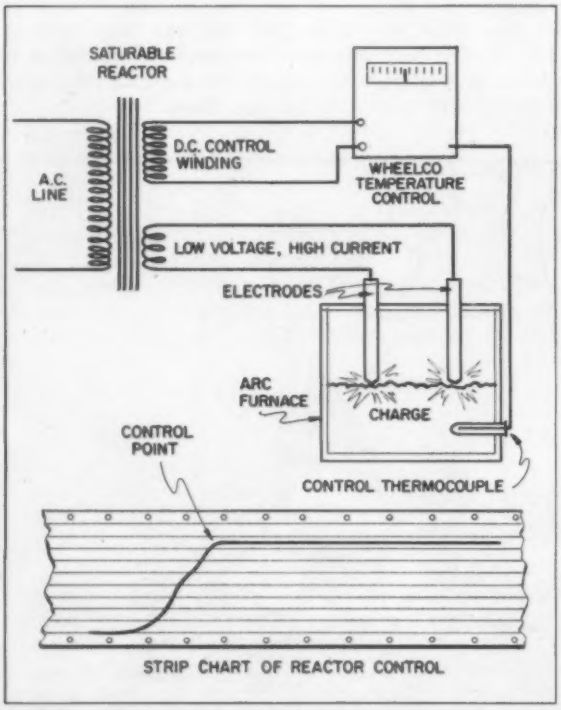


Fig. 1. Saturable reactor furnace control provides a signal proportional to the temperature, controlling the input current

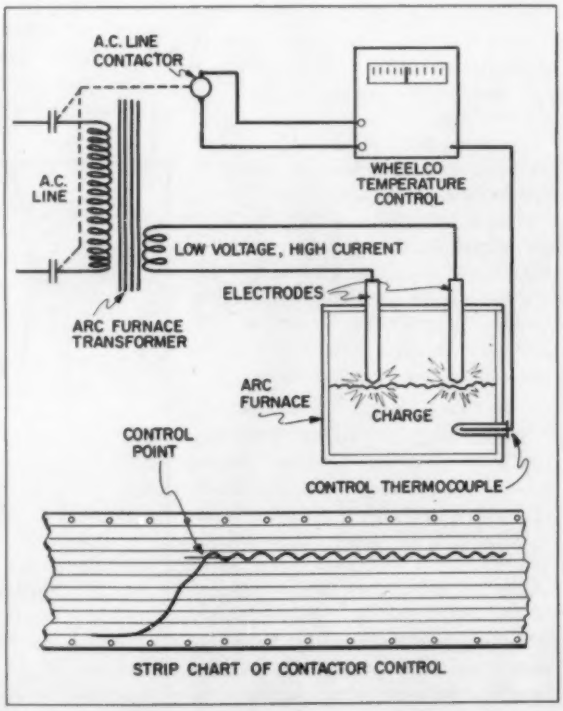


Fig. 2. Contactor type furnace control depends on a change in temperature for operation resulting in poor regulation

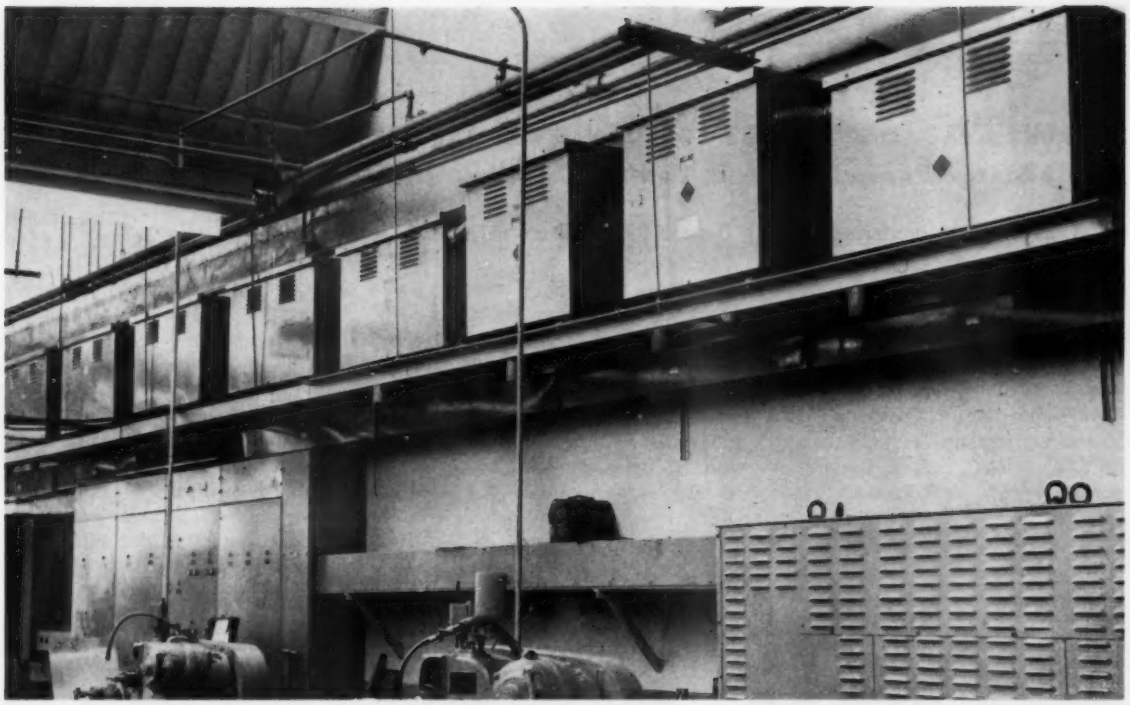


Fig. 3. Saturable reactors, on balcony outside heat treat area, require no more attention than conventional transformers

these up and down variations accumulate to a sizable error.

Our heat treating department now includes a pit carburizer, two karbomatics, a rotary hearth furnace, a test furnace, and a pit-type draw furnace. Twelve saturable reactors in all are employed in furnace control, with two reactors used on each two-stage furnace.

Limiting pyrometers are used in the furnaces and hooked to Wheelco instrumentation which in turn operates the furnace recorder and furnishes the current for the d-c coil in the reactor. This set-up has proved very satisfactory and provides the critical temperature control required for maximum heat treat quality.

Reactors require no more maintenance or attention than any transformer, and most of ours are mounted high on a wall and out of the way. The perfect modulation provided by the reactors, which results in just enough current being drawn for a given job, keeps furnace power requirement costs at a minimum.

Each reactor was specifically tailored to the job it must do. Cost of the equipment was nominal and in line with other types of precision furnace heat control units. Each furnace is, of course, equipped with a safety device which would operate a control panel relay in the event of possible trouble in the reactor controls. **End**

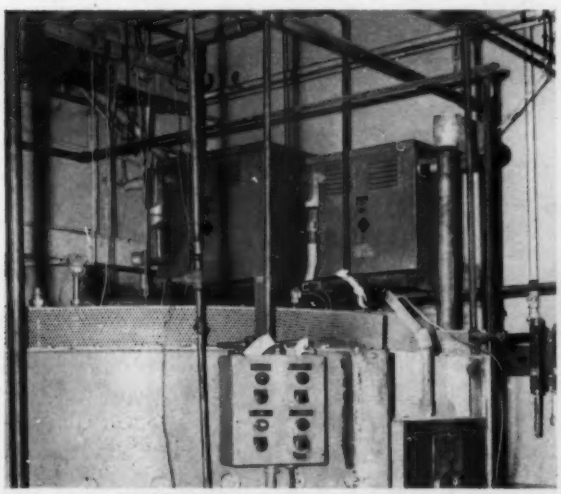


Fig. 4. Two saturable reactors are used to control this two stage rotary hearth furnace. Reactors mounted on back wall

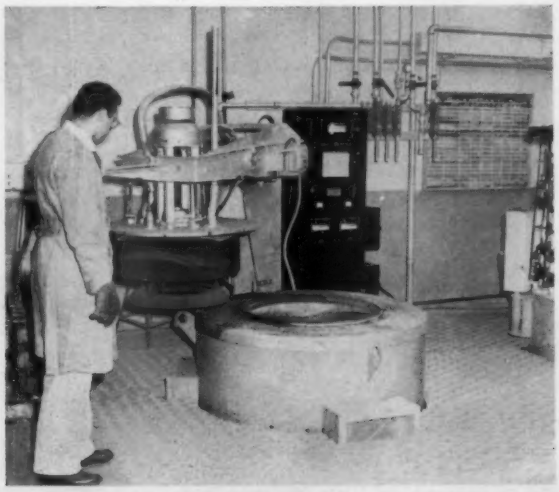


Fig. 5. Wheelco instrumentation operates the furnace recorder and furnishes current for the d-c winding in the reactor

How To Get What You Need in Pumps

Don't Blame Pump Makers If You're "Under-Pumped" or Overcharged

By J. A. CABLE, Centrifugal Pump Dept. Allis-Chalmers Mfg. Co.

WHEN YOU BUY a pump—or any other piece of equipment you hope you are buying the size and type that will do the job you want done. Of course, it is always possible to "over-buy" or, in the vernacular, "Send a man to do a boy's job." Equally unwise, or perhaps even more dangerous, would be sending a boy to do a man's job.

So, how do you go about specifying pumps (which is what I am going to discuss in this article) so that you get as close as possible to the unit that you need without spending too much money for the original unit, or for spare parts. To put it another way: when do you need a special pump or when will a standard meet your needs satisfactorily? In addition, how do you transmit these specifications and needs to the factory engineer of the manufacturer? What does the manufacturer have to know so that he can supply you with the unit that will most nearly meet your needs and most economically do the job you want done? We hope the information contained in this two-part article will answer these questions.

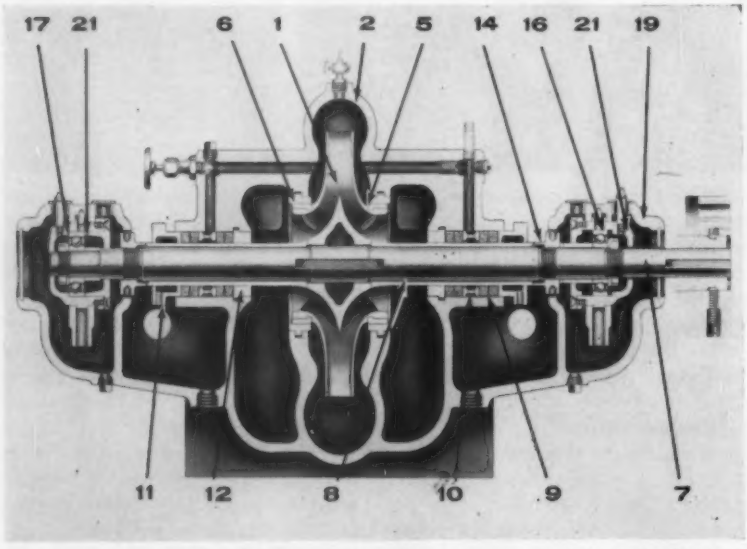


Fig. 1. Typical double-action pump. Numbers correspond to those in Table I

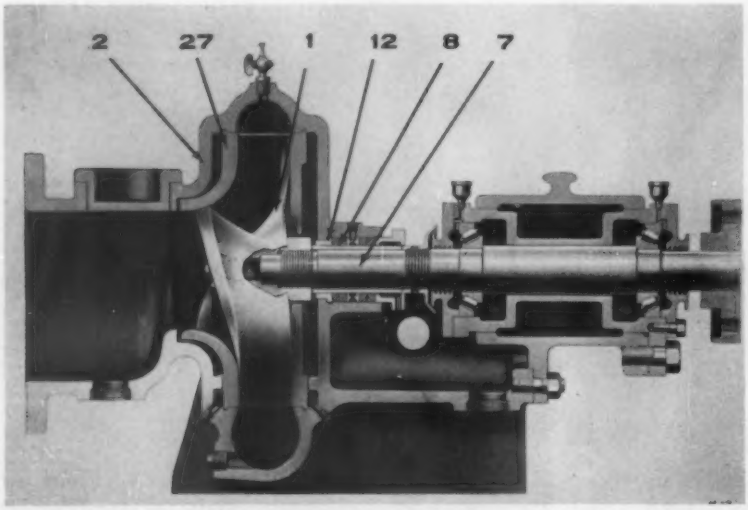


Fig. 2. Cross-sectional view through a single suction pump with open impeller

Centrifugal pumps all have essential, and similar, groups of parts. To establish a starting point, every manufacturer sets up standard specifications. Some of these are applicable to all pump builders while others vary slightly between the different companies.

A basic reason for standards is their use in describing a pump or pumping unit which is made available at a certain base price. Some minor changes from these standards may not involve additions to the base price, but most modifications do necessitate a price increase. Any modification will usually result in using non-stock parts which not only effect original cost but will increase price and procurement time on replacement parts.

These two articles have a two-fold purpose. The first is to briefly describe what construction is considered standard by most pump manufacturers. Part of the following article sets up a common ground as to nomenclature for basic pump parts.

Second, it is desirable to establish an understanding of what parts or design characteristics deserve special consideration. It is the aim of these articles to not only explain what is standard but to also point out when and where special designs should be specified.

Some extras often asked for serve no purpose and can reach alarming proportions. Sometimes they rule out standardized lines which would

Table I. Standard nomenclature of centrifugal pump parts established by The Hydraulic Institute are in left hand columns. In right hand columns are comparable terms used by pump manufacturers. Numbers refer to numbers in Figs. 1 through 4

Ref. No.	Proper Name	Also Called — Remarks
1	Impeller	Propeller, runner, wheel (Propeller is still proper for the specific group called axial flow pumps)
2	Casing	Case, housing, shell, volute (When horizontal split, the two pieces are called upper half and lower half casing with the suction and discharge nozzles in the lower half. When vertically split, the portion having the discharge nozzle and impeller chamber is called the casing.)
3	Suction Cover	Suction half casing, suction head (A removable piece on end suction pumps enclosing the suction side of the casing, usually including the suction nozzle.)
4	Stuffing Box Cover	Rear half casing, stuffing box head (A similar piece enclosing the inboard side of an end suction casing when the vertical split is in back of the impeller. This piece then includes the stuffing box.)
5	Impeller Ring[1]	Impeller wearing ring (Ring is mounted on impeller and rotates with it.)
6	Casing Ring[1]	Casing wearing ring, seal ring (Ring is mounted in casing. With end suction pumps, one of these is usually called either a suction cover ring or stuffing box cover ring and is mounted in position for which it is named.)

[1]The clearance between these two pieces is quite close. Both are replaceable in order to renew this clearance when the rings wear. Some smaller pumps have only casing rings.

7	Shaft	Drive shaft, impeller shaft
8	Shaft Sleeve	Shaft protecting sleeve, stuffing box sleeve (Protects shaft through packing area and may help position impeller.)
	Stuffing Box	(Necessary evil in any pump since the impeller must be driven by the shaft which must enter through casing sidewall.)
	Stuffing Box Details	These parts service the stuffing box.
9	Packing	Soft packing, metallic packing, stuffing (Packing is to throttle leakage through the stuffing box, not eliminate it.)
10	Seal Cage	Waterseal ring, lantern ring, seal ring, packing spacer (This ring establishes a liquid seal around the shaft and provides packing lubrication. When the product pumped has lubricating properties some of it is by-passed to the seal cage and then the pump is said to have "internal seal." If the product handled will not serve as a packing seal and lubricant, the seal is fed from an outside source and pump is designated as having "external seal." Latter is also used when there is high suction lift or vacuum in suction supply tank so as to prevent air leaking into pump through packing.)
11	Gland	Packing follower, packing gland, stuffing box gland (A follower to position the packing and maintain proper compression on it.)
12	Stuffing Box Bushing	Casing bushing, throat bushing, pressure reducing bushing (A replaceable bushing protecting the inboard end of the stuffing box.)
13	Mechanical Seal	Shaft seal, rotary seal (A mechanical substitute for packing. Two basic elements—one stationary face, one rotation face with assorted positioning mechanisms. The rotating portion is affixed to the shaft or over the shaft sleeve; the stationary face is mounted in the outer end of the stuffing box. This is either integrally closed to receive seal or fitted with an appropriate solid gland.)
14	Shaft Sleeve Nuts	Shaft nuts, sleeve nuts (Positions sleeve which may in turn position impeller.)
15	Impeller Nut	(A nut used to position the impeller on an end suction pump)
	Bearings	Ball, roller, sleeve bearings

	For Pump Type Double Suction	Single Suct.	Other
16 Inboard	Nearest Coupling	Farth. From Coupling	
17 Outboard	Opposite end from Coupling	Nearest Coupling	Vertical Axial & Mixed
Thrust	Opposite end from Coupling	Nearest Coupling	
Radial	Nearest Coupling	Farthest from coupling	Flow pumps have thrust bearing in driving motor

18 Housing	Bearing body, bearing bracket
19 Cap	(Upper portion of housing if split on horizontal)
20 Cover	(Smaller portion of housing if split on vertical)
21 Adapter	(Extra piece to go between bearing and housing or between bearing and shaft)
22 Deflector	Thrower, slinger (A means of preventing pumped fluid from escaping along shaft and entering bearing housing. Also to prevent oil escaping from housing.)
23 Diffuser	Bowl, diffuser casing, discharge bowl
24 Suction Bell	Suction bowl
25 Discharge Elbow	Discharge head
26 Column Pipe	(Connection between diffuser and discharge elbow on vertical mixed and axial flow pumps.)
27 Side Plate	Wear plate, front side plate, rear side plate, casing wear plate. (A replaceable plate used with open impellers.)
28 Interstage Diaphragm	Interstage plate, interstage bushing
29 Base Plate	Bed plate (Base under pump and usually also extended to support driver.)
30 Frame	Bearing pedestal, bearing bracket. (Support member on which an end suction pump casing is mounted and in which rotating element is installed.)

Pump Construction Terminology	
Standard	Usually cast iron casing, bronze fitted which includes impeller, rings, sleeves, bushings, seal cages and glands. Shafts carbon steel although some times stainless if pump is built without sleeves.
Fitted	Fitted pumps will have all parts except the shaft and the casing of the required special material. If you don't want special material used for the balance of the pump parts be specific for each individual item. Do not use the term "trim" as this is not specifically defined and you will get a fitted pump regardless.
All	A pump specified as being all stainless steel or all anything should have every part of the fittings plus the shaft and the casing of the specified special material. This means that all parts in contact with the liquid (called "wetted parts") will be of the special material.

be quite satisfactory for the service conditions to be met. An extreme example would be an instance where a pump is required to deliver 35 ft of head but specifications call for a 200 lb hydrostatic test pressure. If this pump was a booster with 100 lb pressure on the suction, the test requirement would be reasonable, but often specifications such as this will be set up for a pump with little or no suction pressure to affect the total working pressure.

So that we understand one another, let's set up a glossary of pump nomenclature. If we talk the same language, we'll have a better understanding of pumps. The Hydraulic Institute publishes a set of standards which includes a list of accepted names for all parts. In every day usage, many of these parts are also known by other names. Table I lists today's accepted terms plus other names which have been used. Most manufacturers will be using the current list when any of their literature is reissued.

Centrifugal pumps are bought to do a job which consists of producing flow of a liquid against a resistance usually stated in terms of feet of head or discharge pressure.

Capacity: The pump's capacity or amount of flow is usually given in gallons per minute (gpm). This factor is normally the one most readily determined by the inquirer. The function of a centrifugal pump is fluid transportation, so "how much" is quite readily established. If you don't supply quantity data in gpm be specific about the quantity and time period so that the pump builder can convert to gpm. Don't say 10,000 barrels a day unless you tell the capacity per barrel and how long a day you mean.

A pump that would handle 10,000 barrels of wines in 24 hr day would pump

$$\frac{31.5 \text{ gal} \times 10{,}000 \text{ bbl}}{24 \text{ hr} \times 60 \text{ min}} = \frac{315{,}000}{1440}$$

= 218 gpm while 10,000 barrels of beer in 8 hr day would be

$$\frac{36 \text{ gal} \times 10{,}000 \text{ bbl}}{8 \text{ hr} \times 60 \text{ min}} = \frac{360{,}000}{450}$$

= 750 gpm. If you left it up to the pump builder to guess how long your day is you might have lots of unhappy Prositers!

If you want capacity in some other measurement such as pounds per hour also tell the specific gravity (temperature from which corresponding specific gravity can be determined). Finally, if you have one job to do today and another use for the pump sometime later, be sure to state both so that the pump supplier can give you the best all-around selection.

Head: Centrifugal pumps force liquid to move against a resistance which the manufacturers rate in terms of feet of head. Some of this head is the difference in elevation between where you get the liquid to where you wish to transport it.

This is static head because it exists with or without flow taking place. Once the liquid is moved through pipes it is also resisted by friction so the pump must develop enough head to equal the static difference plus the friction losses enroute.

But don't stop there! Centrifugal pumps are limited in how much of this head they can develop with re-

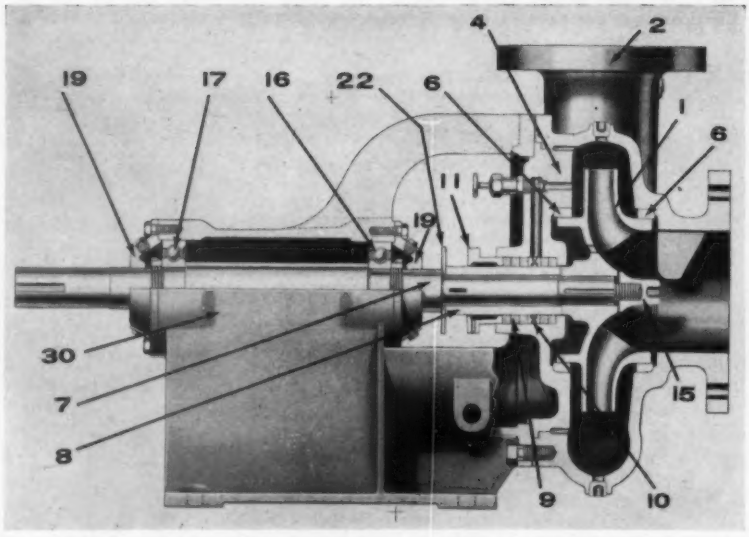


Fig. 3. Typical single suction pump with enclosed impeller and stuffing box cover

Table II. Unusual application factors with reasons why they should be explained to the pump manufacturer

Selection Factor	Describe because affects
Liquid name, if other than water	Material selection. Also other factors such as vapor pressure, specific gravity, viscosity.
Temperature Maximum Minimum	Suction lift limits and material selection if below 20F or over 212F.
[1]Specific Gravity	Driver selection.
[1]Vapor Pressure	Suction lift limits and casing design strength.
[1]Viscosity	Complete selection. If over 2500 SSU pump smaller than 2½" impractical. If over 5000 SSU any centrifugal probably impractical unless quite large.
Elevation	Suction lift ability goes down about one foot for every 900 ft above sea level.

[1]If any of these are subject to variation at different temperatures be sure to include temperature range and whether or not full capacity and head are necessary at worst extremes of temperature.

Table III. In selecting centrifugal pumps by ratings this table will tell you, in general, the types of centrifugal pumps that will fill your particular needs

GPM	Head Range Single Suction (Horizontal End Suction)	Head Range Double Suction
10-50	up to 250-300 ft.	up to 450-500 ft
50-500	up to 250-300 ft.	up to 500-600 ft.
500-2000	up to 150-200 ft.	up to 500-600 ft.
2000-3000	up to 100-150 ft	up to 500-600 ft.
3000-4500	special types only	up to 200-300 ft
4500-10,000		10 to 200-300 ft.
10,000-25,000	up to 25 ft. (axial flow)	10 to 100-150 ft.
25,000-100,000	25-75 ft. (mixed flow)	10 to 100 ft.
100,000. up		

For higher heads it is necessary to go to multi-stage pumps for which the same capacity ranges apply.

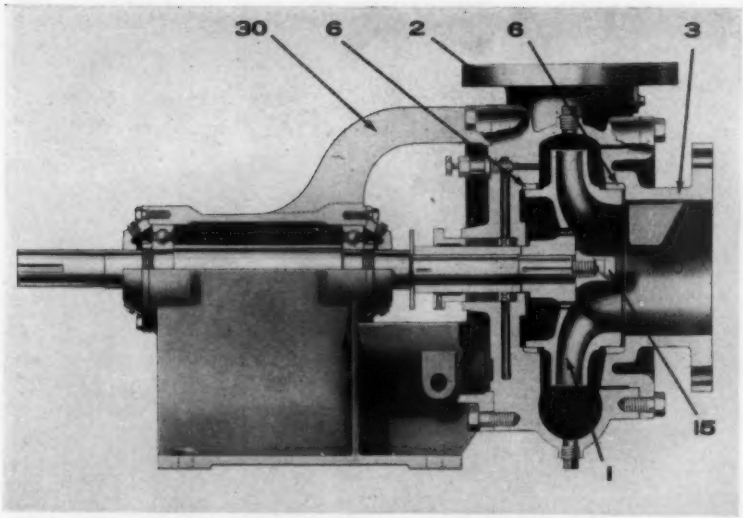


Fig. 4. Section of single suction pump with enclosed impeller and suction cover

gard to the suction side of the pump. So you must tell the pump manufacturer not only the total head but how much of it is before the pump (on the suction side) and after the pump (discharge head).

To have some place to start from, in case you don't describe suction conditions, he will assume that you don't have to pump with any more than 15 ft suction lift. If he assumes wrong here, the pump may not work at all if the lift is too much or if there is appreciable positive head on the suction you may buy a bigger (and more expensive) pump than you need.

Other factors which are important in case there is anything unusual about your application are listed in Table II.

If you have a pump in a certain application now and are buying a new one because the present one won't work, be sure to tell all in your inquiry. Certainly sending the same inquiry which produced the first failure can't be expected to result in a good selection the next time around.

Case history drama:

Salesman: My customer has one of our 5 x 4, Type "X" single suction pumps and it's not worth the powder to blow it to ———. He wants us to replace it with a double suction pump.

Factory Engineer: Give me the rating.

Salesman: Umpteen gpm, plenty of head, etc.

Factory Engineer: Looked up present records. No reason why the pump he has won't do that job.

Salesman: His man is waiting in Mexico City and .....

Factory Engineer: Stop there! That's the reason. The pump's 7000 ft above sea level which is the same as adding about 8 more ft of suction lift. Now I can pick out one that'll do the job.

That one was simple. Others are more or less complicated, but if the pump supplier is told all the facts about the job to be done you'll stand the best chance of getting a pump that performs admirably.

Selection by rating: In very round numbers Table III will tell you generally the type or types of centrifugal pumps that are suitable.

Let's get more specific with reasons for asking for certain types. In the 50 to 300 gpm range you'll have to choose between horizontal end suction, single suction and horizontal side suction, double suction. You will find that on the various comparisons these pumps ordinarily rate as shown in Table IV.

In either case you get what you pay for. Don't expect to get the best pumps for the least money. When seeking competitive bids be specific as to what you want in a pump so that you don't subject yourself to over-zealous salesmen who might leave out something you really need. Don't clutter up specifications with useless trim.

In the next issue we'll get specific about sign posts to watch for when seeking the best casing. **End**

Table IV. Comparison of horizontal end suction, single suction and the horizontal side suction, double suction pumps in the 50 to 300 gpm range of capacities

	Single Suction	Double Suction
Lowest first cost	X	
Compactness	X	
Efficiencies	Similar	
Flexibility of application as to piping arrangements	X	
Direction of rotation	one	two
Reliability	good	better
Suction lift ability		X
Availibility as to materials:		
Bronze	X	X
Cast Iron	X	X
Stainless steels		
Fitted	X	X
All	X	some sizes but more expensive
Stuffing box arrangement	one box	Two boxes
Packing	X	X
Mechanical Seal	X	X
Solids handling	(With special types)	Only very low concentrations
Temperature range	Close coupled to 212 F, frame mounted to 550 F	300 F Max.
Ease of maintenance:		
Nozzles disconnected to open	one	none
Labor union problems	Close coupled means pipe fitter, mechanic, electrician	Mechanic Only
	Frame mounted requires pipe fitter and mechanic	

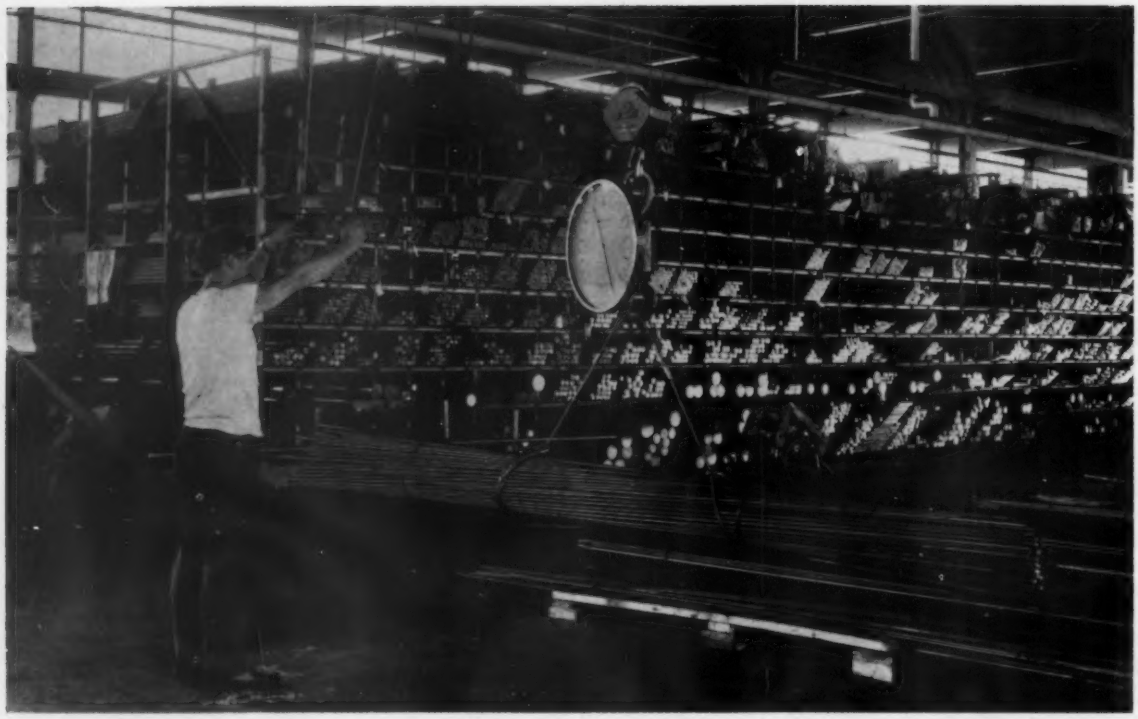


Fig. 1. This 5-ton crane scale weighs incoming shipment of steel bars. To avoid errors, scales should be checked periodically

Check Your Scales—Avoid Errors

They May Be Costing Your Company Money

Frequent, regular tests and a little scale "know-how" can pay big dividends for your company in avoiding weighing mistakes . . . Mistakes which can be costly . . . Here are eight rules on the proper care and maintenance of your scales

By ARTHUR SANDERS, Scale Manufacturers Association, Inc.

WHEN IS AN OUNCE worth $1875? That is a lot of money for an ounce of anything, but a one ounce error on a scale making 100 weighings a day at $1 a pound will multiply to an error of $1875 in a year. Cost of errors are shown in table.

Actually, the example given is a large error for a well-maintained, modern scale, but you would be surprised how many scales are found on test to have errors, percentagewise, as large.

The scale—unlike a conveyor, a compressor or many other pieces of equipment around the plant which will stop or give some warning when they are not functioning right—will go on and on, grinding out incorrect results. Results that may be costing your company a great deal of money.

That is why it is so important to keep this equipment functioning properly. And the plant engineer is the key figure in making sure that this equipment is in good working order.

The usual weighing error that the plant engineer will be concerned with

Table shows the cost of scale errors and how much a company can lose in a year

Scale Errors	Total Error for 100 Weighings	Annual Error Cost of 300 Days at 100 Weighings a Day	
	in lb	$1 a lb	10 cents a lb
1/16 oz	0.39	$117	
1/8 oz	0.78	234	
1/4 oz	1.56	468	
3/8 oz	2.34	702	
1 oz	6.25	1875	
1 lb	100		$ 3,000
5 lb	500		15,000
10 lb	1000		30,000

is the inaccuracy of less than one per cent. This may not seem very important and, unless one calculates the cost of repetitive weighing which may run into the thousands, the actual cost of the small errors is most deceiving.

It will pay the plant engineer to check the possible causes of weighing mistakes and see that they are corrected in his plant.

Causes of Scale Errors

Let's take a look at a few of them.

In many cases the delicate mechanism inside your scale is made to precise tolerances. In fact, some scale parts are made to a tolerance of one ten-thousandth of an inch. That is mighty close. Just plain abuse and hard wear can cause some scale errors by jolting these sensitive mechanisms out of kilter.

Another cause of scale error is friction due to dirt, dust, long wear and abuse. Long wear is a prime cause of friction. Here is how friction can build up in your scale. When it is new, the moving parts are keen and hard. They move against each other easily, and there is little resistance to their movement (which is all that friction is).

However, let us take another look after several years have passed. The parts have rubbed against each other hundreds of thousands of times and in the process of this natural wear, they have developed friction.

When you have friction in your scales, you are going to have weighing errors. Almost always these errors will be against you because, since the parts resist movement, it takes a greater weight on the platform (what your customer receives) than is recorded on the dial (what you charge him).

There is only one of two things you can do if you have friction in your scale: 1. Get it repaired, or 2. get a new scale. Either one is far less expensive than risking the really large losses you can sustain through weighing errors. These can really cost you large amounts of money.

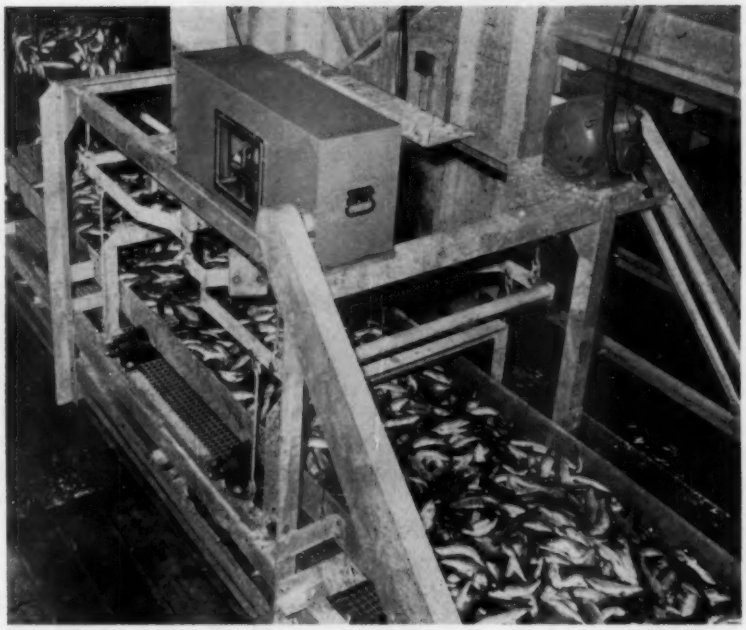


Fig. 2. Conveyor weigher weighs fish as they are received from the hold of a ship

The proper care and maintenance of plant scales will eliminate possible errors, and this can be accomplished by merely following these eight rules:

1. A good scale is a precision instrument—handle it with reasonable care. Abuse shortens the life of a scale.
2. Dirt and moisture can gum up the works—literally— and build up friction in your scales. Keep your scales clean.
3. Never drop loads on scales.
4. Scales can get out of adjustment just like other pieces of machinery. Regular inspection and repair can save you money and headaches. Remember, your scales can give away literally thousands of dollars worth of your goods if they are not working right.
5. Do not let unskilled mechanics repair or work on scales. Be sure that a skilled scale mechanic does the job.
6. Do not overload scales beyond their capacity. This can permanently harm them.
7. Test scales frequently. The mere fact that the scale balances nicely at zero is no valid indication that it is giving correct weight.
8. Replace your scales after reasonable periods of time. Regular replacement protects you from costly scale errors. Friction may build up in worn-out or obsolete scales. **End**

Fig. 3. Track scale weighs and records on continuous basis

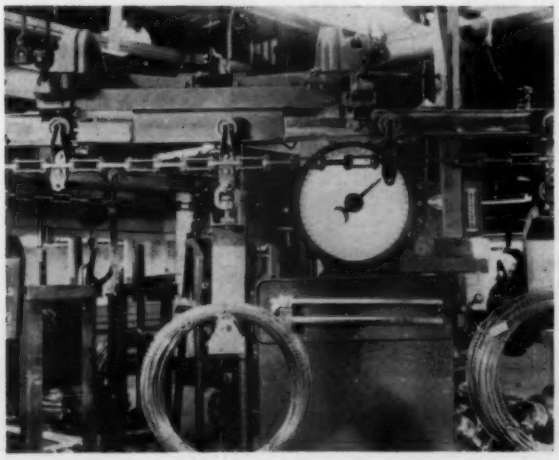
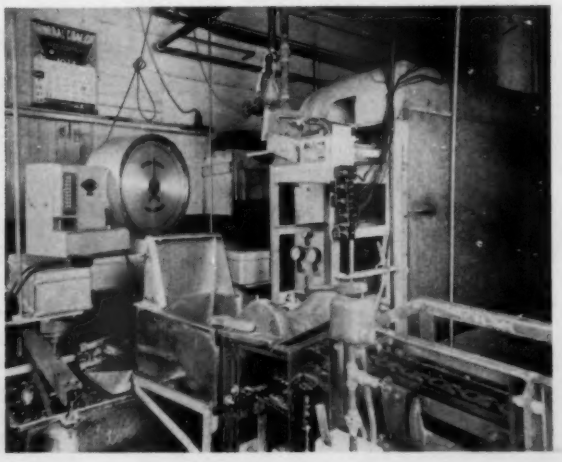


Fig. 4. Weigh station in use at end of can receiving conveyor



Safety Checks for Portable Grinders

Play it safe, see if these safety suggestions are followed in your plant... How to safeguard workers from electric shock . . . Portable equipment do's and don'ts . . . Precautions necessary when using an air powered tool

CARE IN THE operation and handling of grinding wheels, disk grinders, buffers and wire brushes will go a long way in safeguarding the worker from possible accidents. The hazard of electric shock is of primary importance in the operation of electrically powered tools. Other types of accidents are flash burns, falls resulting from shock, and being hit by flying fragments or the disk itself. Here are some suggestions of what you can do to reduce these accidents.

Electrically powered tools used in wet areas or in metal tanks expose the operator to conditions favorable to the flow of current through the body, particularly if one is wet with perspiration, since salt water is a very good conductor. Most shocks from electric tools are caused by defective insulation permitting current to flow into the metal frame. In other words, the frame becomes "charged."

Safeguard your electrical tools by using a third wire to drain off any current leakage to earth. The new National Electrical Code now makes the installation of a third wire mandatory on electrical appliances. The wire is insulated with green rubber and has one end connected to the metal frame and the other to the third prong of the three-wire polarized service plug.

The second possibility of electric shock is the insulation failures that result from passing cords over sharp edges, hot steam lines, oil spillage on floors, or running over the cords with steel-tired equipment. A visual inspection in combination with the use of a Megger to check the value of the insulation is recommended. Mark the inspection date on a durable tape and fasten it to the cord near the appliance. Inspect the appliance at the same time.

Wheel Exposure

In addition to electric shock, it is also important to safeguard the worker from close contact with the grinding wheel. For portable grinding, the maximum exposure on the periphery of the wheel should not exceed 180 degrees. Preferably only enough of the wheel or disk should be exposed to reach the work. Goggles and face shields should be worn for protection because unusual positions of the rotating device will cause particles to be thrown in all directions.

Portability of a power operated tool exposes it to more abuse than stationary equipment. This is certainly true of portable grinding equipment. The wheel should be kept away from water and oil, which might readily affect its balance and degree of hardness. It should also be protected against blows from other tools. Do not strike the sides of the wheel or disk against hard objects or drop the tool. Provide a special storage space for the grinder when it is not in use.

The speed and weight of a grinding wheel, particularly a large one, make it more difficult to handle than some of the power tools. Since a part of the wheel must be exposed, it is important that employees be trained in the correct way to hold and use the wheel so that it does not make contact with the clothes or body. As with all revolving tools, loose clothing and gloves that will catch in the wheel should not be worn.

With pneumatic portable grinders overspeeding may occur. Many wheel and disk failures can be traced directly to this cause. Tachometer readings taken on such machines show that through some wear or misadjustment of the governor mechanism a machine rate at 6000 rpm can actually operate in excess of 9000 rpm.

It is important that regular inspection checks for mechnical defects be instituted along with speed checks on all types of air powered tools. In many cases air operated tools are rated by the manufacturer for both load and no-load speeds. From the wheel strength standpoint, the free running speed, which is always the higher, must be considered the operating speed of the grinder.

Air pressures also play an important part in the safe operation of air powered tools. Excessive pressure can readily cause dangerous over-speeding while low pressure causes loss of production, plus defective work output. **End**

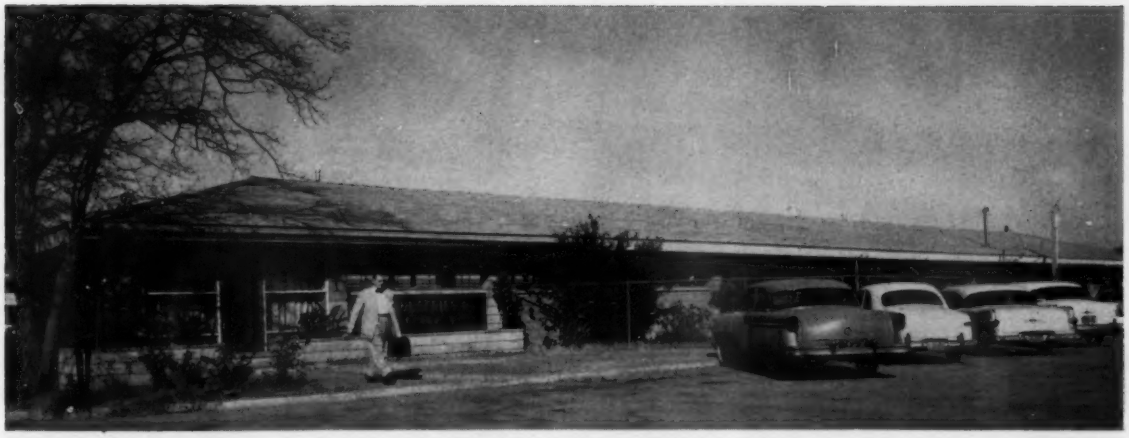


Fig. 1. From this one-time chinchilla ranch building, Topp Manufacturing Company is now producing electronic products for the Navy. The changeover from chinchillas to manufacturing electronic equipment all took place in just 29 days

From Chinchillas to Circuits

Plant Engineering Department Made the Change in 29 Days

TO THE DESK of Topp Manufacturing Co.'s plant engineer, Fred Munro, came an order one day early in October 1956 which was as urgent as it was brief.

"Find and convert facility to precision electronics production. The plant to be production-ready within 30 days."

Fig. 2. Building originally wired for 115 volts now supplies 480 and 220 volts

Behind Munro's rush-assignment was a hurry-up job for the Navy. Topp, a manufacturer of electronic equipment for the aviation industry, had promised to deliver the $1,000,000 order by March. And, though it had the know-how, it was shorthanded for space. Particularly space to handle a job both complex and tightly scheduled. The only solution: set up a plant to get the job done. To meet its deadline, the company had to be in production by early November at the latest—less than 30 days away.

Challenge to Maintenance

Munro wasn't exactly a new hand at engineering rapid expansions, though neither he nor most maintenance chiefs often face a 30-day deadline for readying a new production facility. Still, the company has, since its founding in 1951, kept its maintenance crews in high gear. The company opened 1956 with 200 employees, two plants (both in Los Angeles) and $3 million annual gross. It closed the year with 1000 employees, a gross of $10 million, three plants in Los Angeles, a plant in Danbury, Conn. and laboratories in Pennsylvania.

That 30-day deadline initiated what some call "Munro's ordeal", but which others rank as among maintenance's more challenging jobs.

It began with an order and was quickly followed by specific instructions: a. find production space enough for upwards of 120 employees, including engineers and assemblers; b. install 50-kva switchgear for 480-volt, 3-phase, 100-amp, and 220-volt, single-phase, 3-wire, 200-amp services; c. install minimum lighting to provide 80 cp illumination in all working areas; d. install 3 kva, 400 alternator and auxiliary 1 kva, 400-cycle supply, including secondary feeders to laboratory, production and test areas; e. provide 28 volt d-c 200-amp power supply and distribution circuits to engineering, production and test areas; f. fabricate 265 lineal feet of production benches and install with 110-volt mold strips, and with 400 cycle and 28 volt d-c outlets.

Plant Engineer Munro went scouting for a structure that would meet production requirements. He found it—a one-time chinchilla ranch building—within three blocks of Topp's main Los Angeles plant.

Structurally, the facility was ideal. It was a one-story single narrow building, low-roofed and constructed of concrete blocks. The building 200 by 25 ft, was set on a 357 by 210-ft lot. Portions of the building were

Fig. 3. Modular work benches, partially completed, were designed by the maintenance staff. They are 7 ft long, 32 in. wide and 36 in. high and rest on steel legs

still cluttered with chinchilla cages and more cages stood where Munro had decided to grade a parking lot. But there were no live critters on the premises. Neither were there rest rooms, electricity (other than 115 volt), water, telephones, sewers, gas for heating or any major utility runins. More vexing, the area hadn't been zoned for industry—and more particularly, not for a plant which would, at peak, employ more than 100 people.

Yet Munro's first inspection convinced him that the building could be at least partially converted within 10 days, and ready for full production within 30. The company's works manager, E. C. Butt and Herbert J. Petersen, its president, gave Munro the go-ahead.

Within a week the area had been rezoned for industrial use. Munro invited a handful of unhappy neighbors to tour the company's main facilities, and handily proved that electronics production would be a valuable asset to the neighborhood.

Working with a half dozen of his staffers and calling in subcontractors to install sewage lines and major electrical runs, Munro had, within four days after signing of the lease, swept the ranch building clean of its last vestige of chinchillas . . . and just in time, too. For promptly, the advanced cadre of designers moved into the one-third of the building assigned to engineering.

What Plant Engineering Did

Meantime, maintenance had designed modular work benches, some 265 lineal feet of them. They were 7-ft long, 32-in. wide, 36-in. high and stood on steel legs, their tops decked with 2-in. of tempered Masonite. Each was fitted with electrical outlets and tied one to the other by twist-lock couplings—noninterchangeable plug-ins for each electrical service.

Working seven days a week, 10 to 12 hours a day Munro's plant engineering staff: 1. installed the main power station; 2. brought in a gasoline-fueled generator set, 7½ kw, 3-phase, 220 volts, to supply the needed 400 cycles; 3. hung the building's wooden trusses with 8-ft slimline fluorescent fixtures (trusses were 10 ft 2 in. off the floor); and 4. ran air lines from a 5-hp compressor to the benches.

Besides utilities, the building had to be partitioned and departmentalized. In addition three exhaust fans,

Fig. 4. On the twenty-ninth day, workers were busy assembling intricate electronic components at the new work benches. Benches are equipped with three different service outlets, and so designed that services plug into one another

Fig. 5. Machinery in place, the company was in business in the converted facilities only a month after the lease was signed. And, it only cost the company $25,000 to convert the 5000-sq ft building to the production of electronic equipment

with ¼ hp motors, each pulling 100 cfm, were installed in the attic of the building. A 16 by 42-ft extension was added to the building. This extension houses rest rooms and the power station (chemical toilets were brought in, pending hook-up of sewage lines).

What on first inspection had seemed a routine chore—the paving of 13,860 sq ft for parking—proved anything but routine. Cause of the trouble: two decades of chinchilla ranching. For 20 years the prospective parking lot areas had been hutching ground for chinchillas. Evaporative coolers had been used to climatize the hutches. And through the years, cooler seepage had completely saturated the parking lot area.

One Trouble Spot

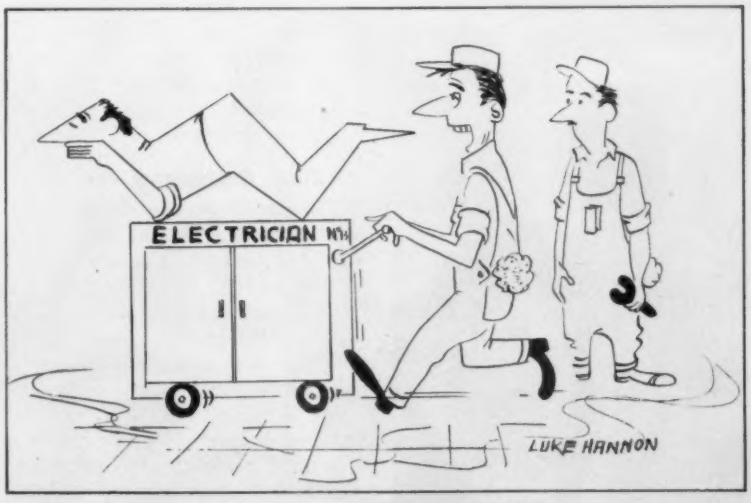
When a contractor's dozer skinned off the future-parking site, water oozed up through the soil. Investigation showed water penetration to a depth of four feet, underlying almost the whole of the parking lot. Munro ordered dozers to excavate to that depth. Some 400 tons of rock were dumped into the excavated subsoil as foundation for the rolled asphalt parking surface.

Heaviest machine installed in the plant was an automatic wiring unit. However, the ranch building's original six-inch reinforced slab, surfaced with asphalt tile, was tested and found capable of carrying loads of 1½ to 2 tons, ample for the machinery involved.

The maintenance department had to run gas lines for heating and for a coffee urn. Maintenance also repainted the building, interior as well as exterior; built a prototype lab; installed a potting area, where electronic plugs could be encapsulated in plastic (required by Navy specifications).

Within 29 days after lease of the building, the first assemblers sat down at their benches. Thirty days later—in early December—the converted chinchilla ranch was delivering its first shipments to the Navy. During the first three months of 1957, the plant turned out $1,000,000 worth of intricate electronic gear.

Best from management's viewpoint was the cost: only about $25,000 to reconvert 5000-sq ft of chinchilla shelter to electronic production. **End**



"I told you to stay away from that wire"

Piping, girder supported, above, spans the sawtooth roof. At left, installation. Hot process-water softener, lower left, was installed on site of the old boiler house

Convair Doubles Steam Capacity

Modernization Program Ups Efficiency, Consolidates Operations in Central Location

THREE-YEAR PROGRAM of steam plant consolidation to centralize steam generation in a single building at Convair San Diego plant, has doubled load capacity, upped operating efficiency nearly 20 per cent and more than halved the number of operating personnel. Twenty-two boilers scattered in five boiler rooms have been replaced by five new centralized generators. What's more, Convair expects the $472,000 modernization to pay for itself within five years.

Plant Engineering Study

These are highlights of the steam plant consolidation, completed this year. Involved was Convair's Plant 1. Built in 1935, the original single-building unit (about 225,000 sq ft) had, by 1953, expanded to 12 main buildings and more than 50 auxiliary structures. The production complex was served by 22 widely scattered boilers.

A 1953 plant engineering study showed that steam plant centralization would pay for itself in about five years, in spite of estimated modernization costs pegged at $450,000 (actual costs, spread over three years, ran to $472,000). The job of consolidation was done in three phases.

First phases began when Convair's plant engineers removed four old boilers from the larger of the boiler houses, which had been selected as the site for the new central steam plant.

Installed in their place were two new boilers, a hot process softener and two boiler feed pumps. An existing 15 psig steam line was converted to 120 psig, and a pressure reducing station was installed in a main production building. Added, too, were two new fuel oil tanks for handling No. 6 fuel oil. Aim of this first phase was to initiate the project which this year sees centrally housed five 40,000 pph, saturated steam, full water-wall furnaces. Each is a three-drum, split-boiler, package type, pressurized furnace. The new centralized plant is likewise equipped with three feed pumps: two are

rated 200 gpm at 180 psig and are motor driven. The other, turbine driven, is rated 200 gpm at 180 psig.

The hot process softener has capacity of 18,000 gal per hour condensate; 7,000 gal per hour, raw water. The softener tank is 10 ft diam by 24 ft high with two, 57 gpm anthracite filters, with provision for one additional filter. Guaranteed softener effluent hardness is 360 ppm. Second phase, completed in 1955-56, saw a third new boiler installed, the conversion of an existing 15 pound steam line, erection of a new condensate return line and conversion of four pumping units to higher discharge pressures. Third phase, completed this year, involved removal of 18 old boilers, plus installation of a boiler feed pump and two new boilers for a total of five in the new central station.

Also built were five new pressure reducing stations. An existing station was overhauled thoroughly so that it could serve the remaining nine main buildings.

Features of the system include:

1. Existing monorail structures and bridges to support the new distribution piping. Some piping is placed on roof tops. All three construction phases were completed without loss of plant production time.

2. Three main buildings were dead-ended. Reducing valves were placed in the boiler house, eliminating costly conversion of the existing, tunnelled distribution system. In one building, the pneumatic pilot and relief valve were placed at the building header. The pipe line, undersized for 15 psig, acts as a reducing orifice downstream from the diaphragm motor-operated reducing valves.

3. Line trap-discharges are connected to the pumped condensate lines. To avoid hammer, the discharge pipe was swaged to a nozzle end bent to a 45-deg angle, and inserted inside the condensate pipe.

Increased Efficiency

Results from this three-year-long consolidation program are:

1. Convair's Plant 1 steam capacity has been increased from a 50 per cent load factor, in 1953, to 100 per cent, with a surplus of 20 per cent in 1957.

2. Operating efficiency now stands at 81 per cent, compared to 62 per cent in 1953.

3. Only nine operators man the centralized plant. By comparison, 24 operators were formerly needed to oversee the widely scattered steam units.

4. All buildings are now effectively heated. Cold zones have been eliminated. Eighty per cent of the steam plant's output is used for heating. The remaining 20 per cent serves plant processes.

5. With higher steam pressure, Convair has been able to initiate some new production processes such as high temperature cleaning.

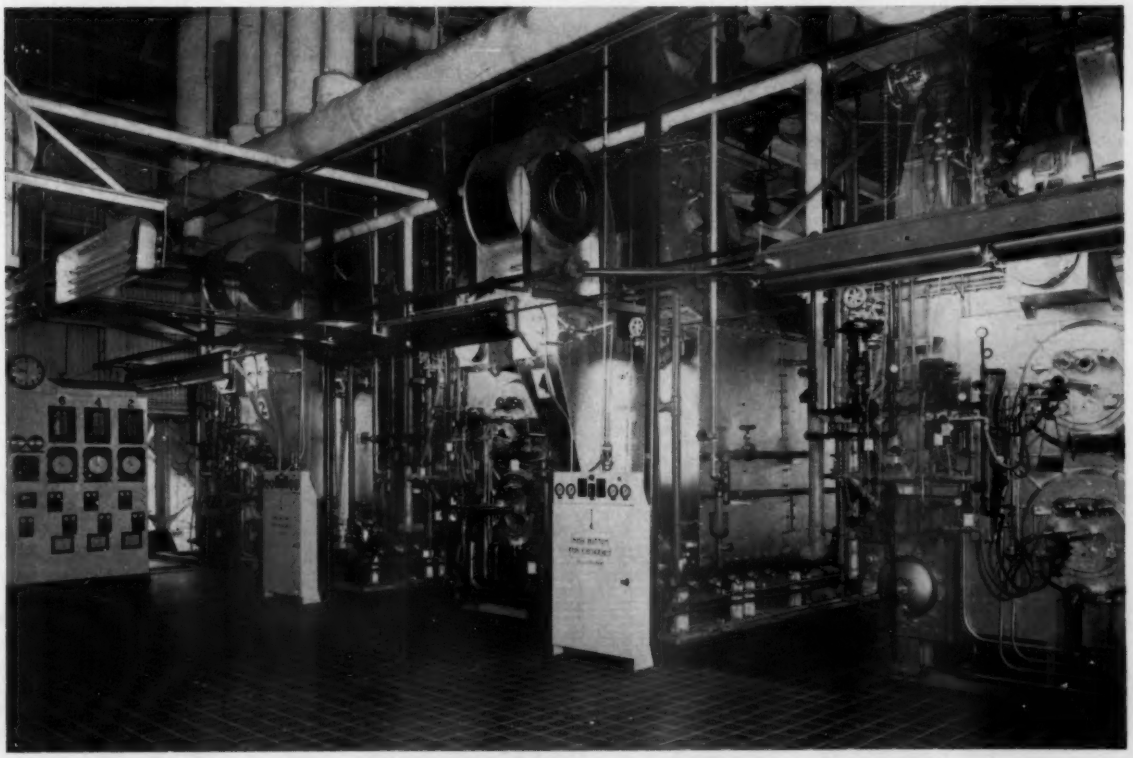
6. Heating equipment formerly fueled by gas or run by electricity is being converted to steam.

7. Plans are now afoot to use steam-operated refrigerating equipment, further improving the year-around load factor.

8. Despite slightly-higher-than-estimated installation costs, the $472,000 investment will pay for itself within five years—as originally estimated.

9. Centralized steam generators serve the 1.8 million sq ft production complex (about seven times the plant's 1935 size) and its 17,000 employees. **End**

Fig. 4. Overall view of new boiler room. Control panel is at far left. Note that each boiler has individual sub-panel



Boiler Blowdown

Types Used and Determination of Amount

By J. S. BEECHER, Chief Chemist, E. F. Drew & Co., Inc., New York City

WHEN STEAM is generated in boilers, the solids concentrate in the boiler water. Unless a portion of the boiler water is removed and replaced with feedwater, the total solids in the boiler water may build up to a value where foaming occurs. Foaming can result in carryover. Salts may deposit on boiler metal surfaces and deposits can result in tube failures. Silica may be carried with the steam and the carryover can foul turbine blades. All are serious conditions.

The following factors determine the amount of concentrated boiler water that should be removed from a boiler: 1. Type of boiler. 2. Operating pressure. 3. Operating conditions. 4. Quality of makeup water. 5. Amount of condensate recovered for boiler use.

All boilers are equipped with blowdown valves to permit removal of boiler water intermittently from a low location such as a mud drum. Many boilers are equipped with a device to permit continuous removal of a small portion of boiler water.

When certain constituents in boiler water concentrate beyond specific amounts, they can cause problems. In Table 1 are several ingredients, the difficulties they effect, and the approximate maximum amount of each that should be permitted in boiler water.

During boiler operation, sufficient boiler water must be removed and replaced with feedwater to limit the constituents, concerned, below the approximate maximum concentration. Boiler blowdown is usually expressed as percentage based on feedwater. Hence, the following expression defines blowdown: Measured quantity of water blown from the boiler divided by the measured quantity of feedwater used and result multiplied by 100 equals per cent blowdown.

A more convenient means for the determination of per cent blowdown involves the measurement of chlorides in the feedwater and boiler water. To get the per cent blowdown, the chlorides in the feedwater are divided by the chlorides in the boiler water and the result is multiplied by 100.

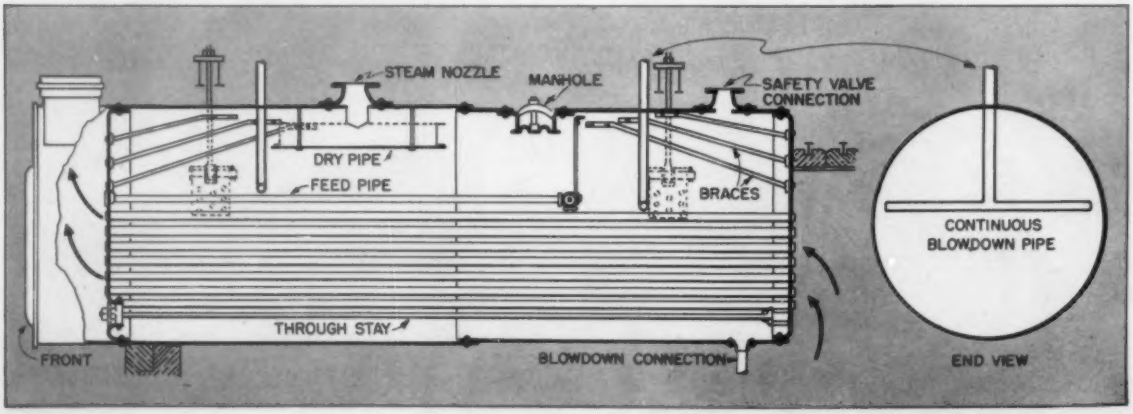
Chlorides in the feedwater and boiler water may be used as a basis for determining the per cent blowdown since they are not affected by chemical treatment. Hence, chlorides can be used to determine the estimated concentration of certain other constituents. If 10 ppm of chlorides and 50 ppm of total hardness are present in feedwater and the feedwater is permitted to concentrate ten times in a boiler, 100 ppm of chlorides and 500 ppm of hardness salts (precipitated as sludge) should be present in the boiler water.

It is simpler to measure chlorides in

Table I. Some constituents that may be present in boiler water and effects

Constituents	Primary Trouble Caused By Exceeding Approx. Maximum Permissible Concentration	Permissible Maximum Concentration (ppm) At Pres. Less Than 200	300	400	500	600
Total Solids	Carryover	3500	3500	3000	2500	2500
Suspended Solids	Deposits	550	300	250	150	150
Total Alkalinity (as CaCO)	Carryover	700	700	600	500	500
Silica as SiO	Deposits; silica carryover	200	125	65	40	25

Fig. 1. Continuous blowdown pipe in form of "T" placed toward rear of shell; holes should be in the horizontal run



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Here are five key areas you'll want to explore when selecting a supplier. As you glance through them, notice how well Rome Cable "stacks up" as the kind of supplier we think you'd like to have serving you:

1. Quality products. Only when your supplier consistently provides the *best* can you have real confidence in him. The quickest way to a customer's trust, we've found, is through an inspection routine almost unbelievably rigid, where the Inspection Department is completely independent of both Production and Sales. This procedure results in products you can depend on.

2. Broad selection. Your supplier's *versatility* often determines how ably he can serve you. You can look to Rome Cable for a balanced line of standard wires and cables as well as highly specialized types of cable—in either copper or aluminum—plus a growing selection of conduit, cable troughs, and related equipment.

3. Rapid supply. How fast can you get the wire or cable you want? Are you sometimes forced into postponing wiring plans or accepting substitutes? No matter where your plants are, you can get prompt service from one of 450 Rome distributors, located coast to coast. These men carry a wide variety of different types and sizes of Rome wire and cable *in stock*—ready to go to work for you *today*.

4. Personalized service. How accessible are your supplier's salesmen when you really need them? Your Rome sales engineer is ready to work with you and your men at any time. Whether you need technical advice, emergency shipments, price information, or special help of any kind, a Rome representative will immediately go to work for you.

5. Research. Are you getting the advantage of *new improvements* in the wire and cable you buy? To do so, you need a research-minded supplier like Rome—with a research program that has developed an impressive string of industry "firsts," and the production know-how to bring better wires and cables to you as soon as they are proved.

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the feedwater and boiler water than hardness salts for determining the blowdown requirement. A maximum allowable chloride tolerance in the boiler water is set and this tolerance regulates the permissible maximum concentration of some constituent such as suspended solids.

Gallons of feedwater, if not measured, can be calculated by using the following expression:

$$\frac{\text{Steam generated (Lb)} \times 100}{(100\% - \%\ \text{blowdown}) \times 8.33}$$

Then gallons of blowdown can be determined by multiplying the gallons of feedwater by the per cent of blowdown.

Two types of blowdown may be employed, i.e. intermittent and continuous. Generally, the primary intermittent blowdown connection is located at the lowest part of a boiler. This may be a lower or mud drum, bottom of a shell or bottom of a header. The equipment for bottom or intermittent blowdown is normally supplied as part of the boiler. Secondary intermittent blowdown connections may be located at water wall headers. A boiler may be blown down intermittently from all connections once a day, once a shift, or many times a day.

Intermittent blowdown accomplishes the following: 1. Reduces the total solids content (dissolved solids plus suspended solids of boiler water). 2. Removes accumulated sludge from the blowdown location.

Continuous blowdown removes a small portion of concentrated boiler water (dissolved solids plus suspended solids) continuously from a specific location in a boiler through a properly sized and located pipe.

The continuous blowdown piping is always located so that the boiler cannot be drained below a certain level. This piping is not supplied generally with a boiler although connections for installing it are often provided. Continuous blowdown should never be located in a low part of a boiler since there is the danger of lowering the water level too low.

Lowering the water level too low may result in tube failure due to overheating (boiler metal becomes exposed to heat and is not cooled by boiler water), setting the stage for trouble. **End**

Table II. Advantages and disadvantages of continuous, intermittent blowdown

Considerations	Intermittent Blowdown	Continuous Blowdown
Y=Yes; N=No; A=Advantage; D=Disadvantage		
1. Under normal operating conditions regulates boiler water solids continuously within a narrow range.	N—D	Y—A
2. Removes accumulated sludge from boiler	Y—A	N—D
3. Control over chemical treatment is simplified	N—D	Y—A
4. Time of feeding water treatment should be scheduled according to blowdown procedure	Y—D	N—A
5. Load conditions must be considered	Y—D	N—A
6. Blowdown requirements depend to a large extent upon the human element	Y—D	N—A
7. Heat recovery equipment such as a flash tank and heat exchangers may be employed	N—D	Y—A

Load Cells Joined Electrically for Weighing

ACCURACY IS an important factor in weighing steel for shipment. Until a recent time, bar mill weighing in a large eastern plant was done by means of a system which had passed the state of normal repair or replacement.

The knife edge, pivot points and bearings were completely worn. Hence, a recommendation to replace the scale was made. This resulted in a decision to use an electronic system employing load cells.

In the weighing system change, the platform and scale pit were retained. In place of the mechanical linkage, four 10,000-lb compression type Baldwin load cells were mounted beneath the platform on concrete piers.

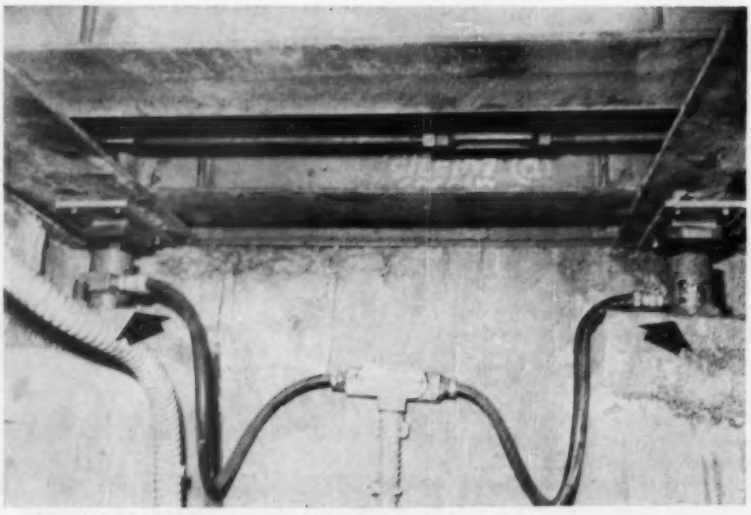
Bearing blocks, resting on the collars of the load cells, transmit load forces at the four corners. Check rods were installed to give the weighbridge the proper lateral support required. The load cells were then wired into the electronic circuit.

In operation, when a load of steel rounds, rods, or flats is lowered onto the scale by the overhead crane operator, it rests on the platform supports. An immediate reaction occurs in the load cell.

Voltage change indicating a change in resistance is picked up by the amplifier. Then the impulse is transmitted to the servo and balance motors located in the scale dial mechanism.

The electronic signal moves the dial pointer on the calibrated scale, indicating the number of pounds in the load on the platform. **End**

Fig. 1. Pit view shows two of the four cells on top of scale's concrete piers



2 easy ways to drop out unwanted detail

Take your choice of these short cuts whenever standard drawings must be modified . . . or parts of a design must be eliminated.

1. Reproduce the drawing on Kodagraph Autopositive Paper—you get a positive photographic intermediate directly, with dense black lines on a clean white translucent base. Scissor out the unwanted detail . . . and make another Autopositive Paper print. Lots easier than redrafting—and so is the alternate method.

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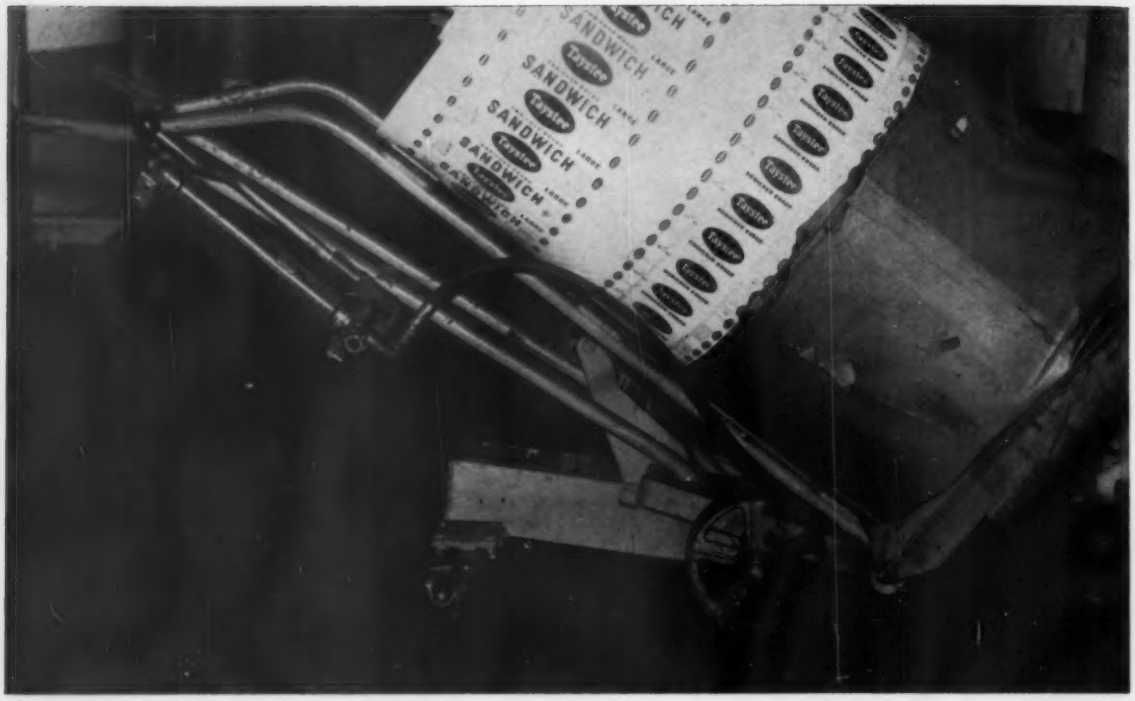

Fig. 1. Loaded hand truck, ready to move roll. Hydraulic jack takes work out of lifting or lowering roll for handling

Hand Truck Adds Hydraulic Power

By D. E. GERS, Asst. Superintendent, Western-Waxide Specialty Packaging Div., St. Louis, Mo.

Fig. 2. Length of pipe serves as lever to tilt roll into position

HANDLING HEAVY ROLLS of waxed paper has become much less hazardous, and much easier, since we began using a special roll-handling truck that was designed and pilot-built in our shop.

As the rolls of paper come off the printing press or waxer, depending on the stage in the process, they are in a horizontal position. Purpose of the truck is to help the operator take these rolls, move them to storage, and set them in a vertical position. It is also used to take the rolls from storage, move them, and facilitate turning them horizontally to be placed on mandrels for insertion into a machine for slitting.

When stored, each roll is stood on end on a special pallet, designed to fit the forks of the hand truck. The use of individual pallets under each roll avoids damage usually done to a paper roll when truck forks are "nosed under" its edge, to pick it up.

The device is essentially a hand truck, equipped with forks and a special pallet for use under the rolls. In addition, the truck has a hydraulic arrangement for lifting the roll from a horizontal position to an approximate 45-degree angle. The same hydraulic piston serves to lower the roll from the 45-degree position to the horizontal.

To pick up a roll from the storage area, the truck provides a system of three fulcrum points that enables an operator weighing as little as 150 lb to handle rolls that weigh as much as 1400 lb. **End**

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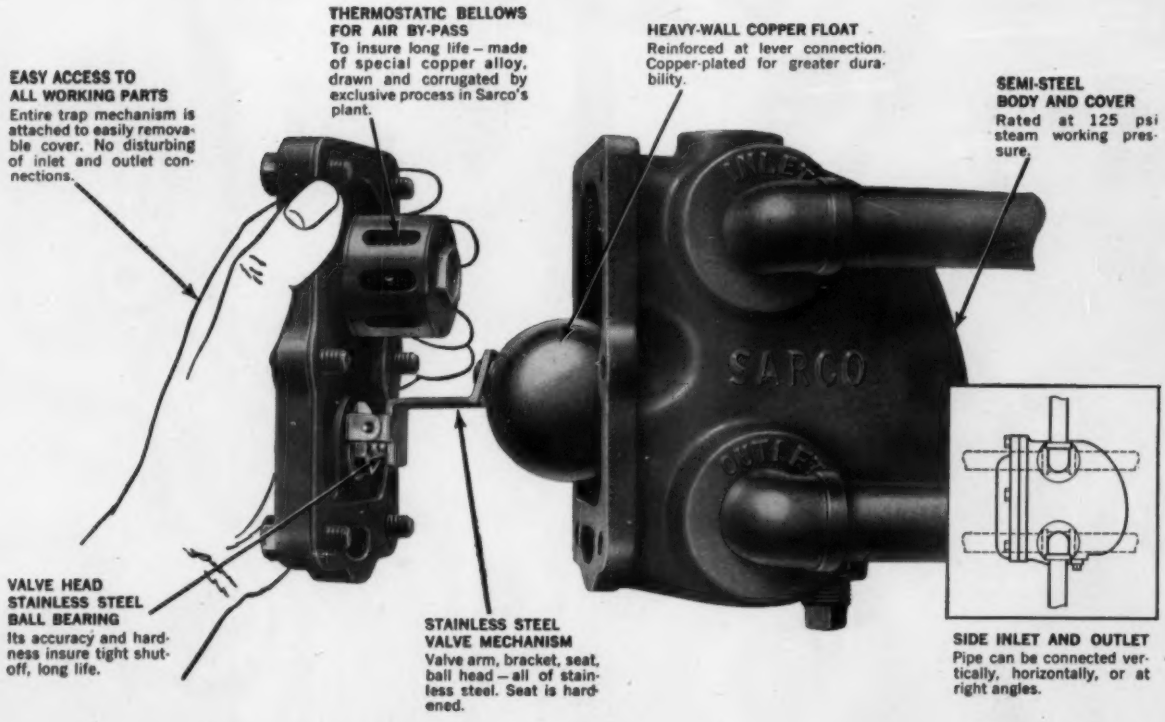
NEW SARCO FLOAT-THERMOSTATIC STEAM TRAP

with improved engineering features


EASY ACCESS TO ALL WORKING PARTS
Entire trap mechanism is attached to easily removable cover. No disturbing of inlet and outlet connections.
THERMOSTATIC BELLOWS FOR AIR BY-PASS
To insure long life – made of special copper alloy, drawn and corrugated by exclusive process in Sarco's plant.
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Rated at 125 psi steam working pressure.
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VALVE HEAD STAINLESS STEEL BALL BEARING
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STAINLESS STEEL VALVE MECHANISM
Valve arm, bracket, seat, ball head – all of stainless steel. Seat is hardened.
SIDE INLET AND OUTLET
Pipe can be connected vertically, horizontally, or at right angles.

This new, improved Sarco Float-Thermostatic Steam Trap Type FT discharges condensate at steam temperature continuously and without shock.

Recommended to drip steam mains, unit heaters, blast coils, heat exchangers, and other allied process equipment, requiring accurate temperature control.

Air Binding Impossible – equipped with separate thermostatic air vent, which removes automatically and immediately all air and incondensable gases reaching trap. Balanced pressure vent self-adjusts to all operating pressures. Its location above condensate level permits discharge of air and gases reaching trap after start-up. Does not require adjustment when pressures change.

Sizes – ¾ and 1″
For steam pressures – 0 to 125 psi

Write for Bulletin 455-B to Sarco Company, Inc., 635 Madison Avenue, New York 22, N. Y.

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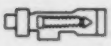
Thermostatic Steam Traps



Liquid Expansion Steam Traps

Thermo-Dynamic Steam Traps

Float Thermostatic Steam Traps

Camlift Bucket Steam Traps

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General Electric reports ***New Progress*** *in switchboard design*

New Distribution Switchboard is easier

The new standardized switchboard accepts any combination of seven different types of protective devices: G-E molded case and large air circuit breakers; current-limiting molded case circuit breakers; combination circuit breakers and current-limiting fuses; fusible interrupter switches; and power protectors. In fact, the new Type DR allows you to add, replace or rearrange more types of protective devices in more combinations than ever before possible; in the field...quickly...and with minimum labor.

The new Type DR Switchboard comes in standard 28″, 35″ and 47″ widths. It is designed for 600-volt or less service and braced for 50,000 amperes asymmetrical (40,000 amperes symmetrical) short circuit current faults as standard, and for 100,000 amperes asymmetrical (85,000 amperes symmetrical) optionally. Its mains are rated 800 to 4,000 amperes.

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to specify, estimate, install and expand

Built to pre-determined standards from pre-fabricated components, General Electric's new Type DR Universal Switchboard comes to you as a *known* quantity. It is pre-engineered and pre-tested to give assurance *in advance* of dependable on-the-job performance. We *know* its IC — we *know* its ampere capacities—we *know* its exact dimensions, its safety parameters, the capabilities of each of its components and other functional characteristics. *We* know them and *you* know them — *before* delivery of the switchboard. In addition, this new design and construction provide these other important benefits:

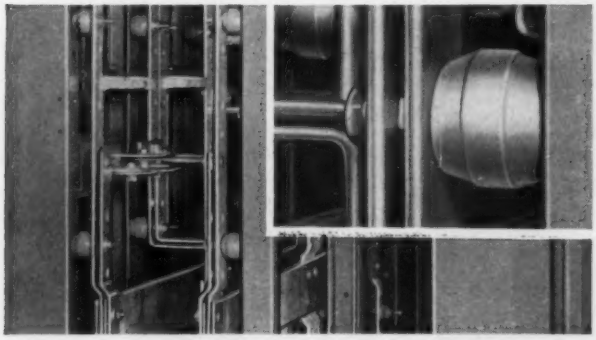
Cut hours from engineering, days from delivery. You can easily lay out and compute for yourself the size and cost of this universal switchboard from published information. Standardization means short-cycle manufacturing . . . frequently allows delivery in as little as one week . . . assures adherence to original delivery schedules, often in spite of last-minute specification changes.

Easier to install and maintain. Every terminal is easily accessible for quick, easy connections . . . unobstructed by bus bars or braces.

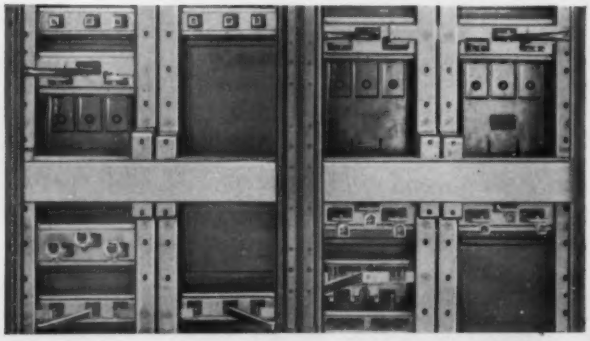
Easier to add capacity. You can easily double the useful capacity of this switchboard for future expansion or unexpected load requirements simply by adding an extra set of pre-drilled bus bars. Bus bars are silver plated, providing low contact resistance.

Easier to modify or expand. New switchboard sections can be added without special fabrication and with assurance of match and line-up. Breakers and switch units can be added or removed without disturbing the established load connections.

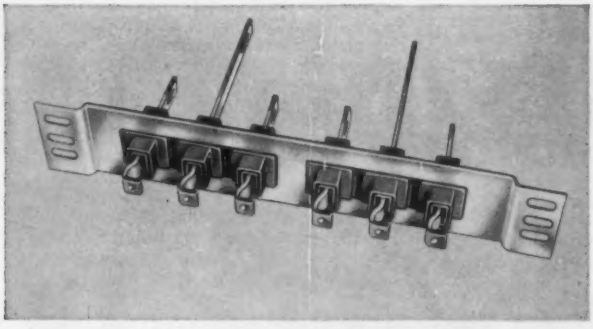
See your G-E Representative or G-E Distributor for complete information on Type DR. Ask for Bulletin GEA-6627. Or write to **General Electric Company, Distribution Assemblies Department, Plainville, Conn.**



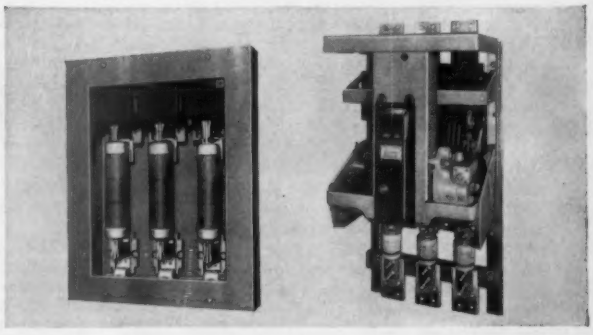
New molded bus insulator adds reliability. Molded in one piece of glass fiber-reinforced polyester, a new insulator increases the reliability of the entire switchboard. This insulator has high impact strength, high arc resistance and low moisture absorption.



Horizontal busing provides "elbow room," cuts installation and maintenance time. Main bus bars are at mid-height with vertical step-down bus bars off to each side. Entire rear of switchboard is open, above and below main bus, for full working access to back-connected protective devices.



Straight-in wiring, speedier installation with new stud assembly. Eliminates wire bending . . . allows "straight-in" wiring . . . opens up more working space to speed installation. Strong, light-weight, non-magnetic aluminum barrier mounts stud assemblies . . . minimizes heating from induction currents.



Latest in Fusible Components. This switchboard incorporates fusible interrupter switches with a 12-times load break rating at a price competitive with conventional pressure switches. Type QMR unit, left, is rated from 30-600A, and the Type LB-1 power protector, right, is rated 800-4000A.

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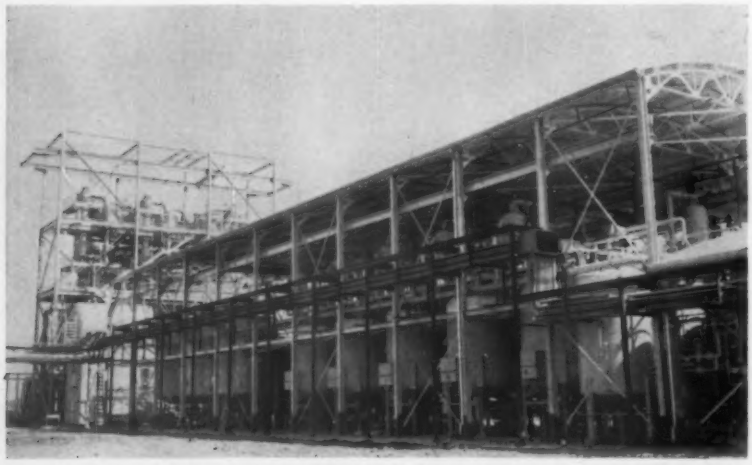
NEW PLANT CONSTRUCTION — advance information on location, costs

Selma, Ala. — Alabama Metallurgical Corp. is building a new magnesium manufacturing plant here. New plant will have an initial production capacity of 10,000 tons of magnesium per year. Cost of new facility reported to be about $7 million.

Fontana, Calif.—Linde Co., Division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y., has announced a multi-million dollar expansion of company's production facilities of liquid oxygen and liquid nitrogen. Additional facilities will also be installed to further process the argon and rare gases—xenon, krypton and neon—that will pass through the plant.

Hercules, Calif.—Hercules Powder Co., Inc., 917 Market St., Wilmington, Del., has authorized major expansions at two of its plants. Construction of the California project, a urea producing facility with production capacity of 10,000 tons annually, will begin at once and is scheduled for completion by late 1958. Company will also expand facilities at Kenvil, N. J., for the manufacture of propellant cartridges.



Heart of expansion increasing production 50 per cent at Goodyear Tire and Rubber Company's Houston, Texas, synthetic rubber plant are two lines of new reactors

Lathrop, Calif.—Best Fertilizer Co., 1459 Third St., Oakland, Calif., has authorized construction of a new ammonia plant on a 40-acre plant site near here. Work is already under way on the new facility, scheduled for completion by early 1959. Plant with equipment will represent an investment of approximately $4 million.

Merced, Calif.—Continental Can Co., Inc., 100 E. 42nd St., New York 17, N. Y., manufacturers of packing cans, plain and decorated cans and boxes, plans to construct a new facility for the manufacture of the company's products here. New plant will be erected on a 25-acre site. Facility when completed, in early 1959, will cost approximately $3.5 million.

Richmond, Calif.—A. R. Mass Chemical Co., Division of Victor Chemical Works, 155 N. Wacker Drive, Chicago 6, Ill., has purchased an 80-acre plant site in this city. The Division plans to construct a new processing plant for the production of phosphoric acid and a catalyst unit for the food, chemical, petroleum and agricultural industries and will use 15 to 20 acres of the site for initial construction.

Montville, Conn.—Olin Mathieson Chemical Corp., 460 Park Ave., New York, N. Y., plans to construct a small plant for the assembly of nuclear reactor cores, on local site here. New facility, is scheduled for operation by late spring of 1958.

Jacksonville, Fla.—Owens-Illinois Glass Co. has announced a major expansion program at company's 19-year old pulp and paperboard plant here. Contract in excess of $2 million has been let to Merritt-Chapman and Scott Corp., 260 Madison Ave., New York, N. Y., for modernization and improvement of the old facility. Work will be concluded by late 1958.

Valdosta, Ga.—Carr Consolidated Biscuit Co., Wilkes Barre, Pa., has announced construction of a new plant here for the manufacture of company's "sweet goods" line including cookies and crackers. A building site of 13 acres has been selected for the 75,000-sq ft plant situated on the Georgia and Florida Railroad. Plant with equipment reported to be a $1-million investment.

Boise, Idaho—Boise Cascade Corp. plans to construct a pulp and paper mill and a container plant along the Columbia River, 30 miles west of Walla Walla, Wash. New mill will have a daily productive capacity of approximately 150 tons of kraft paper or liner board for corrugated boxes and some bag and wrapping paper. Plant is expected to be in production by spring, 1959.

Moline, Ill.—Deere & Co., agricultural implements, plans to construct a multi-million dollar administrative center on a 675-acre tract of land, near here. Erro Saarinen, Finnish architect, has been appointed to design the project which will consist of three large one-story buildings for administrative purposes, a large research and development building for laboratory and research work and a large auditorium.

Indiana Harbor, Ind. — Inland Steel Co., 38 So. Dearborn St., Chicago, Ill., plans to double plant capacity for wide flange beams through remodeling and adding new equipment to existing facilities here. Approximately 28,000 tons of the beams are produced monthly. Capacity for this type of beam will be increased to 54,000 tons as a result of the expansion program.

Fort Wayne, Ind.—Farnsworth Electronics Co., 3702 E. Pontiac St., has authorized plans for the construction parts and products. Plant, with a floor area of 160,000 sq ft will be built on a 61-acre site along the Pennsylvania Railroad right-of-way and will be fully air conditioned. Work will get under way soon for completion by early 1959. Plant will represent an investment of $3 million with equipment.

Richmond, Ind.—Eaton Manufacturing Co., 739 E. 140th St., Cleveland, O., has announced a major expansion program for the automotive gear division plant located here. Plant addition will consist of a 35,000-sq ft building with an additional 2800 sq ft of administrative space. Work will get under way at once for completion by late 1958. Building and equipment will cost approximately $2 million.

Bay City, Mich.—Dow Chemical Co., 1000 Main St., Midland, Mich., has announced plans for the construction of a multi-million dollar plant here, for the production of polyethylene plastic products. Plant is scheduled for completion by late 1958.

Cleveland, O.—Standard Oil Co. (Ohio), Midland Building, plans to construct a new alkylation unit at company's No. 1 refinery here. Ground has already been broken for the new unit which is reported to cost in excess of $3.8 million. New facility will be completed in early 1958.

Three Rust-Oleum DIFFERENCES that save you time, money and metal!

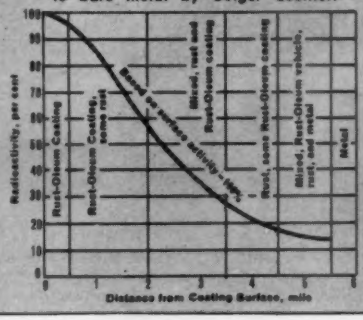
GOES ON FASTER

No tedious surface preparations usually required — just scrape and wirebrush to remove rust scale and loose rust — then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust.

STOPS RUST

Rust-Oleum's *specially-processed* fish oil vehicle works down through the rust into the tiny, microscopic pits in the bare metal where it drives out air and moisture to *stop rust.*

Chart shows results of tracing radio-activated Rust-Oleum through rust to bare metal by Geiger Counter.



LASTS LONGER

Applied over rust, Rust-Oleum lasts longer for the *over-the-years protection* you need. It resists sun, salt water, salt air, fumes, heat, humidity, moisture, weathering.

These are just a few of many important *differences* that separate Rust-Oleum from ordinary coatings. When you consider that Rust-Oleum covers approximately *30% more area,* depending upon surface condition and porosity . . . and the fact that Rust-Oleum finish coatings, with the same fish oil vehicle, are available in nearly every color for *double protection* . . . it's just good, common sense to use Rust-Oleum. Prompt delivery from Industrial Distributor stocks. Write for illustrated literature with color charts.

RUST-OLEUM®

STOPS RUST!®

Rust-Oleum is distinctive as your own fingerprint. Accept no substitute.

ATTACH TO YOUR LETTERHEAD — MAIL TODAY

Rust-Oleum Corporation
2609 Oakton Street • Evanston, Illinois

- ☐ Complete literature with color charts.
- ☐ 30-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.

Rust-Oleum and Stops Rust are brand names and registered trademarks of the Rust-Oleum Corporation.

For more facts circle 573 on Reply Card

J-M Marinite...

Here's how

Now construct your own ovens *in your shop* with efficient, easy-to-work Johns-Manville Marinite.

fast, new way to oven economy

. . . easy to fabricate . . . easy to maintain
. . . builds and insulates in one operation

If downtime and costs are delaying needed oven changeovers—or installation of new ovens—in your plant, here's big news: Johns-Manville Marinite, made of asbestos and diatomaceous silica, can show you the way to build your own high-efficiency oven *in your own shop* at low cost.

Get these important savings

When you build your oven with Marinite, you eliminate the need for linings and outer facings, because Marinite is *both* an efficient insulation *and* a structural board. Your shop can prefabricate oven panels from large 4′ x 12′ sheets with standard saws and drills—assemble them quickly with a minimum of structural support.

Cut maintenance to the minimum

Marinite ovens last indefinitely with little or no maintenance. Made of asbestos fiber, diatomaceous silica and an inorganic binder, Marinite never rusts, rots or corrodes . . . is completely unaffected by moisture condensation during cyclic shutdowns. A rigid, homogeneous material, Marinite eliminates "hot spots" caused by soft insulations that settle and sag in service.

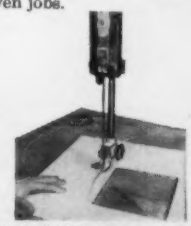
Change over with Marinite now for new oven efficiency

Don't put off your oven changeover another day. With Marinite's low conductivity, you can add new efficiency to your oven at unmatched low cost. And you'll find Marinite cuts heat loss so effectively that areas directly adjacent to ovens become usable, comfortable work areas.

Marinite now carries Underwriters' label

Marinite-23, 36, and 65 now carry Underwriters' Laboratories label for: *zero* flame spread; *negligible* fuel contributed; *zero* smoke developed (based on 100 for untreated red oak). For information write Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ontario.

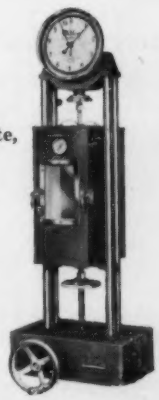
Large Rigid Sheets, up to 4′ x 12′ make Marinite the ideal material for the largest oven jobs.



Workability of Marinite can help you cut oven costs downtime by fabricating and assembling your own ovens.

W. C. Dillon & Co. uses Marinite for easy assembly and close temperature control

W. C. Dillon & Co., Inc., Van Nuys, California, makers of scientific instruments and temperature control cabinets for materials testing, uses Marinite to maintain precise temperature *and* to present a clean, trim appearance. "We would certainly recommend Marinite to any concern interested in *cutting costs and in producing a fine piece of finished equipment,*" says Robert E. Dillon, V. P.



Made of Marinite, Dillon cabinets maintain precise temperatures for materials testing.

JOHNS-MANVILLE JM PRODUCTS

JOHNS-MANVILLE
Insulations
FOR LASTING THERMAL EFFICIENCY

For more facts circle 574 on Reply Card

Marshalling Yard for Gas Taps Texas Pipeline

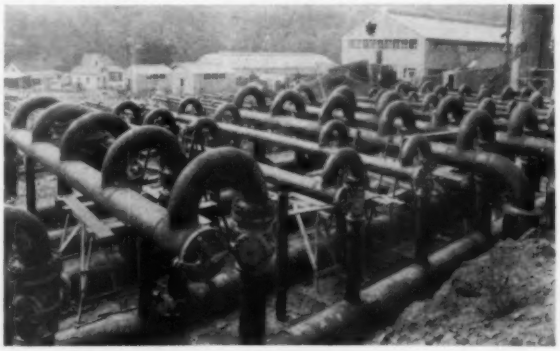
INSTALLED at a compressor station now nearing completion at Majorsville, W. Va., a maze of precision-built piping has been fabricated as a gate nest and related piping system for natural gas.

Made of thick-wall seamless carbon steel, the gate nest will serve as a marshalling yard for routing 83 billion cubic feet of gas annually, in the next three years. The system can handle service demands at various pressures and volumes up to 400 million cubic feet per day.

Five 24-in. underground headers, 11 above-ground crossover lines (from 12 to 20 in. in diameter) 12 precision-bored meter runs, plus four pressure regulator settings and four heater settings make up the piping which links a 5280-hp compressor station with the pipeline system of Manufacturers Light and Heat Co.

Fabricated and being erected by Dravo Corp., Pittsburgh, Pa., the station will, when completed, accept southwestern gas at a pressure of about 550 psi. The gas will pass through the gate nest to the station, where its pressure will be raised to 1200 psi.

Weight and size of the piping involved—an eight-foot section of 24-in. pipe weighs more than a ton—made field fabrication hazardous and impractical. Dravo prefabricated the entire job in its shops, and shipped it in sections.



Movie Projector Mirrors Help Man Duplicate Sun's Heat

TEMPERATURES APPROACHING that of the sun's surface have been produced with ordinary motion picture projection equipment. Highly-polished curved mirrors concentrate rays from a carbon arc into a small but extremely high energy beam that can produce temperatures above 7,000 F. The technique was developed in connection with high-temperature studies at the research laboratories of National Carbon Co., Div. of Union Carbide Corp.

The new design uses two elliptical mirrors of the standard type found in motion picture projection equipment. One mirror directs the energy of the arc at the other, which in turn concentrates the radiation on the specimen being heated, forming a life-size image of the actual arc.

Their light focused by mirrors approximately 18 in. in diameter and placed six feet apart, arc carbons in the furnace are less than one-half inch in diameter. The arc draws a current of 200 amperes, operating voltage is 80 volts.

In addition to its use of standard equipment, the new system has the advantage of providing a narrow beam midway between the two mirrors where a shutter can be placed to turn the energy on and off very quickly without disturbing the arc. A mirror can be placed at the same point, to tip the beam to any desired angle.

Scatter Effect of X-Rays Controlled by Specially Shielded Building

SPECIFICALLY DESIGNED for the radiographic inspection of guided missile airframes, a building recently completed for Reynolds Metals Co. is one of the first to be so designed. It provides complete protection against scatter radiation effect of a 250-kv General Electric x-ray machine. Ray Proof Corp., Stamford, Conn., designed the building and was responsible for the design of all radiation shielding devices employed.

Immediately adjacent to the final missile assembly area, the inspection room is isolated from that area by heavily shielded doors weighing 5000 lb. Missiles to be tested are wheeled through these motorized doors.

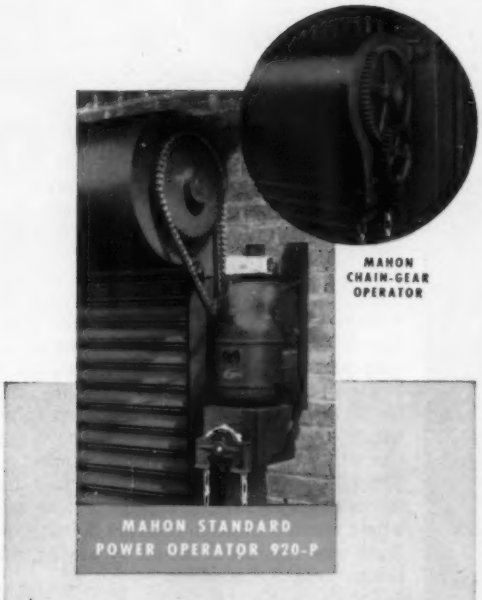
Lead-lined wood panels on one side of the structure protect the dark room and control room. An extra "shield" is the positioning of a wire fence around the outside of the building—so located that it keeps passers-by well out of potentially harmful radiation.

The building has brick exterior and concrete slab interior, and is 30 ft wide, 53 ft long and 17 ft high. The x-ray unit is mounted on a pantographic support, and suspended from overhead crane rails. Prime purpose of the x-ray inspection is to check the soundness of welded joints in the airframe.

Rolling Steel Doors

Manually, Mechanically or Electrically Operated

Here is another multiple door installation where only rolling steel doors could meet the operating and security requirements . . . because, the six doors illustrated below are installed in openings at the ends of six production lines where operating space and positive protection against intrusion were primary considerations. Sixteen other Mahon Rolling Steel Doors are installed in this new, modern boat-building plant. No other type of door can match the space saving compactness and the operating convenience of a good, quick-opening, quick-closing, power operated rolling steel door . . . the vertical roll-up action is fast, requires no usable space either inside or outside the opening—no overhead tracks or other obstructions to restrict headroom and interfere with crane handling adjacent to the door opening. And no other type of door can give you the positive security, firesafety and permanence which is an inherent advantage in Rolling Steel Doors . . . all-metal construction reduces maintenance to a negligible factor, and assure a lifetime of continuous trouble-free service. When you buy a rolling steel door, it will pay you to check specifications carefully . . . you'll find that Mahon Rolling Steel Doors are built better to give you better service over a longer period of time—for instance, the galvanized steel in Mahon curtain slats is BONDERIZED and DIP-COATED with synthetic enamel which is baked on at 350° F. prior to roll-forming. This is just one of the extra-value features of Mahon Rolling Steel Doors . . . comparison will disclose many others that add up to a much better investment. See Sweet's Files for information, or write for Catalogue G-58.



MAHON CHAIN-GEAR OPERATOR

MAHON STANDARD POWER OPERATOR 920-P

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Underwriters' Labeled Rolling Steel Fire Doors and Fire Shutters; Underwriters' Rated Fire Walls; Insulated Metal Curtain Walls; Electrified M-Floors; Acoustical and Troffer Forms; and Steel Roof Decks and Long Span M-Decks.

ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Six of Twenty-Two Mahon Rolling Steel Doors installed in a new plant for the Roamer Steel Boat Division of Chris-Craft Corporation, Holland, Michigan. Owen-Ames-Kimball Company, General Contractors.

MAHON

For more facts circle 575 on Reply Card

HOW Westinghouse

JOB-TAILORED FLUORESCENT LAMPS MEET YOUR LIGHTING NEEDS

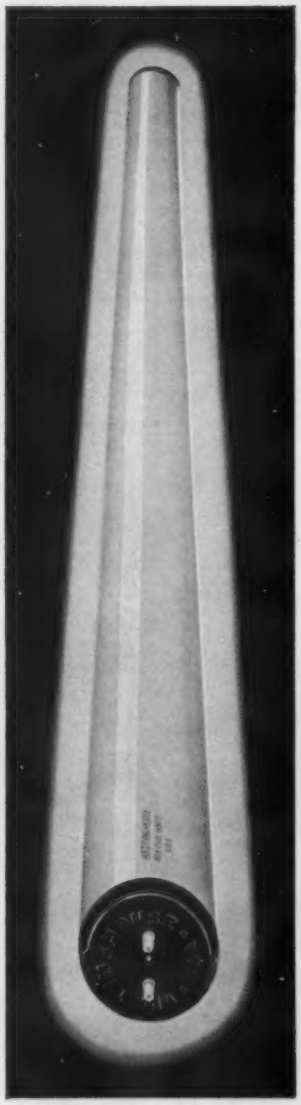
...all with ULTRALUME™ High-Intensity Phosphors • MORE LUMENS PER WATT... more light for your dollar • UNIFORM END-TO END LIGHT • PERFECT COLOR MATCH...ALWAYS • MAXIMUM OUTPUT MAINTAINED THROUGHOUT LONG LIFE

1. New SUPER-HI Fluorescent lamps produce more than twice the light per foot. Designed primarily for high bay (20 feet or higher) industrial and outdoor lighting, a new line of extra high light output fluorescent lamps produce more than twice as much light output per foot as standard fluorescent lamps. The new SUPER-HI lamps permit extremely high energy loading of electrodes, the arc stream and the phosphor. This gives you high light output with new economy at good efficiency and long life.

SUPER-HI lamps are light in weight, convenient to handle and provide a light source subject to the same easy optical control as with present standard T12 lamps, but with over twice the light output. Available in 105, 155, and 205 watts, 4, 6 and 8 ft. The lamps have a rated average useful life of 5000 hours, deliver 6000 to 13,000 initial lumens.

2. High Output Rapid Start lamps give more than 50% more light than regular type. Designed primarily for medium-high bay (15 to 20 feet) industrial and outdoor lighting, four new sizes of Westinghouse high output, rapid start fluorescent lamps can produce over 50% more light than comparable sizes of regular lamps and offer new economy and effectiveness to fluorescent lighting. These lamps provide increased lighting levels, make installations with adequate footcandle values of deluxe color light more practical, and improve the economy and practicability of fluorescent lighting at higher mountings and at lower ambient temperatures.

These lamps are available in 24", 48", 72" and 96" T12 design for general indoor use and for outdoor service where retention of light output at low temperatures is essential. The 72" T12 is recommended for street lighting.



3. Reflector-Fluorescent lamps produce 60% more directed light. For use where external reflectors are difficult or impractical to use, or where dirt deposit cuts lighting effectiveness, these Westinghouse Reflector-Fluorescent lamps provide a directional light distribution which helps put the light where you want it. This is accomplished by a built-in reflecting surface, extending the length of the lamp on the inside of the tube, which redirects about 60% extra light out the other side. Westinghouse Reflector-Fluorescent lamps are recommended for use in coves, showcases and other locations where space is limited. Indirect lighting effects may also be obtained by aiming the lamps toward the ceiling.

They also solve special lighting problems including temporary lighting for construction projects, displays, and exhibits.

Westinghouse Reflector-Fluorescent lamps are available in 40 watt rapid start, 48" and 96" T12 slimline types.

4. Beauty Tone™ Home-line Fluorescent lamps with warm white deluxe color. The same new Westinghouse "Beauty Tone Home-line" lamps which are revolutionizing home lighting by providing warm white deluxe illumination are also ideal for offices, stores and wherever "friendly" color of light is wanted to flatter complexion, enhance the natural color of furnishings, decorations, and displays, and blend well with incandescent lighting.

There's a network of Westinghouse distributors ready to serve you. Call your nearest Westinghouse Supplier for a free Job-Tailored Survey of your lighting requirements. Or write Westinghouse Lamp Division, Bloomfield, N. J.

YOU CAN BE SURE...IF IT'S Westinghouse

For more facts circle 713 on Reply Card

For more facts circle 576 on Reply Card →

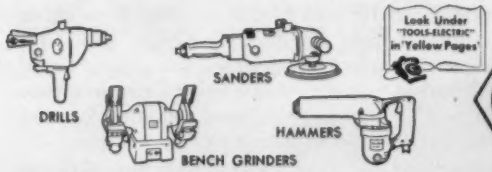
Faster work, fewer rejects with B&D Power-Speed control!

POWER-BUILT Black & Decker Scruguns® drive with precision from finger-lightness to wrench-tightness!

When you team up B&D Scruguns and Power-Speed Control, work goes faster because you choose the correct speed and tension for every assembly job. And you have fewer rejects because this unique combination prevents burring screw heads, stripping threads, shearing screws and marring surfaces.

The compact, lightweight B&D Power-Speed Control is completely portable, easily mounted. Its calibrated precision dial gives instantaneous change of torque and speed. It handles as many as three B&D adjustable clutch Scruguns.

Whatever your application, or the type of driver you are now using, ask your B&D distributor for a demonstration of this precise control—impossible with other power drivers! Or write for free catalog No. 10 to: THE BLACK & DECKER MFG. CO., Dept. 0811, Towson 4, Md. (In Canada: P. O. Box 278, Brockville, Ont.) **Be sure to see the B&D Exhibit at the National Metal Exposition in November.**



Leading Distributors Everywhere Sell

Black & Decker®

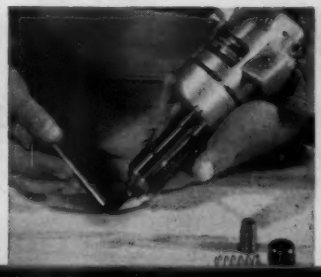
Quality Electric Tools—Power-Built to Last

POWER-BUILT BY B&D, every Scrugun motor is tailor-made in our own plant for the tool it drives, for peak performance and longer service.

CHOICE OF 3 CLUTCHES, positive, single adjustable and double adjustable. Simple external adjustments stay put. No creeping of bit or socket.

EASY HANDLING B&D Scruguns are lightweight, compact, perfectly balanced. New piggy-back reversing switch is located for fast, easy control.

SWIFTY SERVICE SAYS, "Even the best tools eventually show signs of wear—need repair. Give 'em B&D Factory Branch *Service* for top performance."



The Sirocco Wheel—Designed with a multiple number of narrow, curved blades, forward pitched. Operating at low rotative and peripheral speeds, it delivers more air per revolution than any other type of fan.

The HS Wheel—Medium-speed wheel with true non-overloading power characteristic; features large-area die-formed blades, mounted in backwardly inclined position between heavy-duty backplate and streamline rim.

Match the wheel to the job . . . with rugged, quiet American Blower Sirocco and HS Fans!

American Blower fans have Certified Ratings for dependable performance.

American Blower's complete line of fans lets you match the wheel to the duty, whether it's ventilating, air conditioning, heating; or drying, fume-removal, and processing systems. Their heavy-duty design and construction assure you of long fan life with a minimum of maintenance. Take the Sirocco and HS fans, for example:

Sirocco and HS fans offer smooth, quiet air delivery, high operating efficiency and dependable service. They are available in 25 standard sizes from 12¼" to 132" wheel diameters for volumes to over 700,000 CFM.

Precision-built Sirocco and HS fans can be specified in single or double inlet and in any of eight standard discharges, with ball, roller or sleeve bearings as required. Inlet vanes, dampers or Gýrol Fluid Drive can be furnished to meet volume control requirements. Larger sizes are designed so that they can be dismantled for easy handling in shipment, erection and maintenance.

Get details on the complete line of American Blower fans. Call our nearest branch office; or write direct to American Blower Division of American-Standard, Detroit 32, Michigan. In Canada: Canadian Sirocco products, Windsor, Ontario.

AMERICAN BLOWER

Division of **American-Standard**

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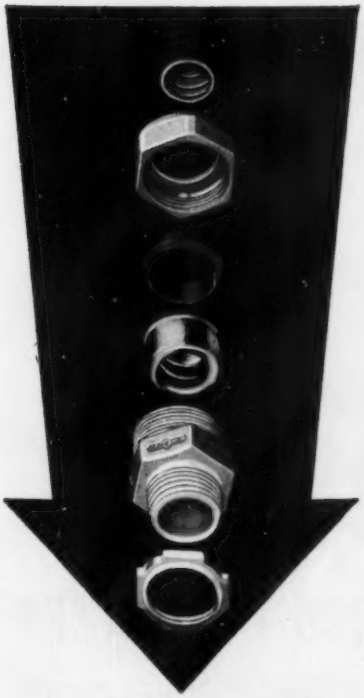
GEDNEY

TOPS THEM ALL!

...in malleable iron quality
...in accurate machining
...in smooth-fitting threading

ROCK-BOTTOM INSTALLATION COSTS... specify Gedney. Machined and threaded with utmost accuracy... smooth-finished, with no metal particles or burrs ... made of the best malleable iron to eliminate breakage... individually inspected to insure absolute top quality. For today's lowest installation cost.... specify Gedney!



LIQUID-TITE CONNECTORS
The most dependable liquid-tight connectors available today. For use with "SEALTITE" and equivalent Liquid-Tite Flexible Conduit. Designed to give wiring absolutely dependable protection against water and oil. Built for lifetime service. Available in sizes ⅜" to 2"... straight... 45° and 90°.

90° CORNER ELLS
Top-quality Malleable Iron, cadmium plated. Fitted with gasketed cover. Both ends female. Available in a full range of sizes from ½" to 2".

90° CORNER ADAPTERS
Top-quality Malleable Iron, cadmium plated. Fitted with gasketed cover. One end male, one end female. In sizes from ½" to 2".

GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY
GEDNEY
RKO BLDG., RADIO CITY, NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

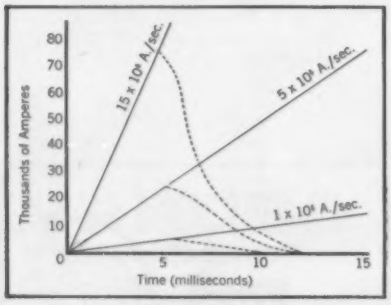
For more facts circle 578 on Reply Card

D-C CIRCUIT BREAKERS

Type FB-20 single pole circuit breaker; 2000 amperes continuous, 1000 volts d-c.

NEW "FB" CURRENT LIMITING CIRCUIT BREAKER

Now...complete current limiting protection against fault currents of 1000 to 150,000 amperes



Peak let-through current for FB circuit breaker with 1000 ampere trip.

Small in size, these FB d-c circuit breakers with fast current limiting action provide a tremendous protective capacity. In the event of a fault, powerful springs open the contacts before the current has a chance to rise to its maximum potential.

Even in circuits where the rate of rise might approach 15,000,000 amperes per second, let-through current will not exceed 80,000 amperes. In most applications, it will never exceed 30,000 amperes—and total interrupting time is only 12 milliseconds. This quick action reduces the magnitude and duration of fault currents—thus eliminating mechanical failures and heat damage.

FB circuit breakers are available in either single or double pole models and with continuous current ratings of 1200, 2000, 3000 and 5000 amperes and up to 1000 volts d-c. They are available with either stationary or drawout mounting. Write for Bulletin 3004-A. I-T-E Circuit Breaker Company, Switchgear Division, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

IN CANADA: EASTERN POWER DEVICES LTD.

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For more facts circle 580 on Reply Card →

FREE TO YOU

This helpful, informative Macwhyte Safe-Lock Wire Rope Assemblies Catalog 5601

Macwhyte Wire Rope Assemblies have a wide variety of applications. They may be used for operating controls, as a part of machinery and equipment, or for slings and hoists.

They are widely used on small gasoline powered equipment, outboard motors, mining machines, agricultural implements, automotive equipment, aircraft, boats and yachts, production machinery, laboratory equipment, etc.

This catalog will prove invaluable to you in determining assemblies for your needs. For your free copy write on your company letterhead to: Macwhyte Company, Kenosha, Wisconsin. You'll receive your free Catalog postpaid, by return mail.

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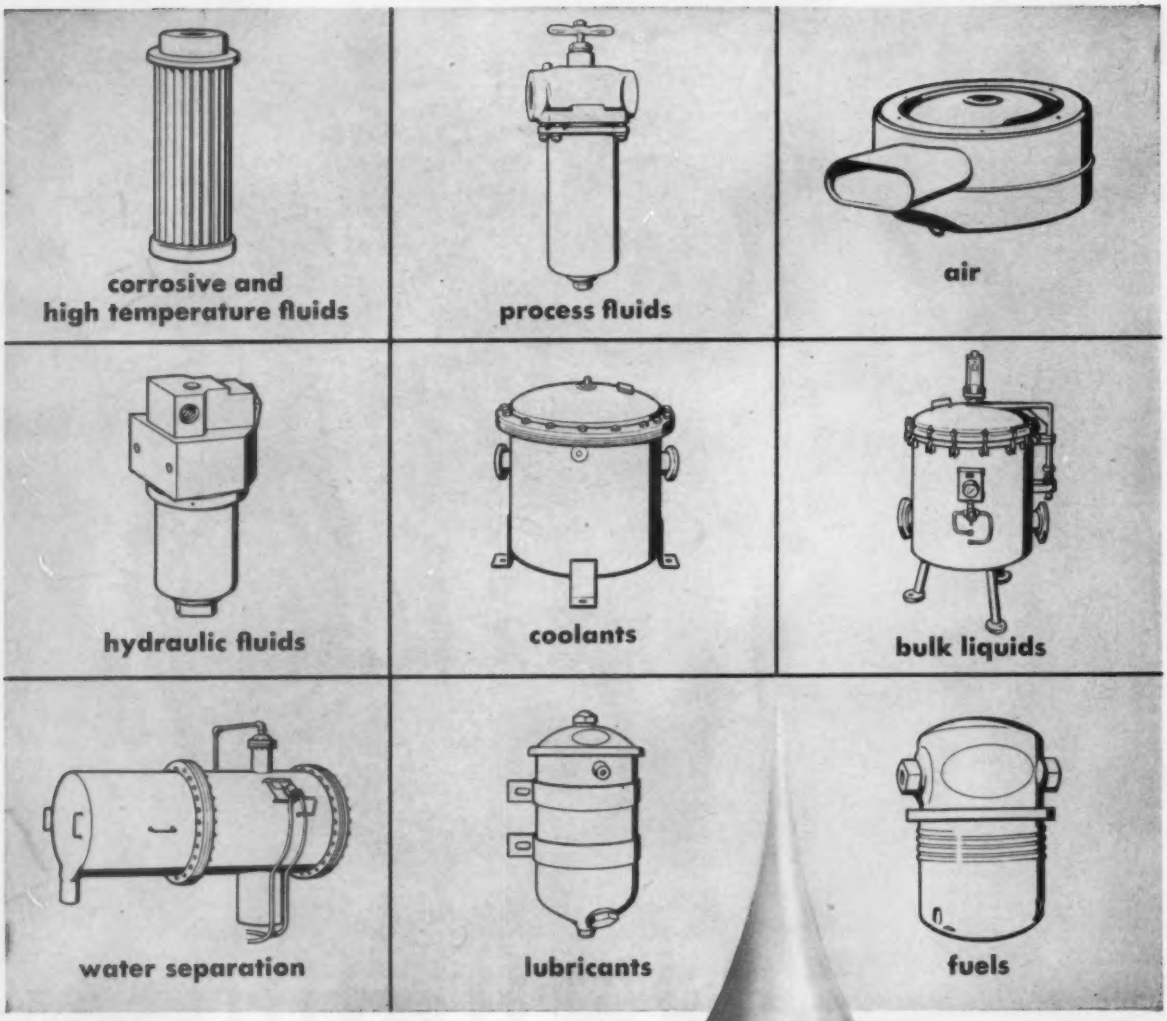

There are over 2,000 filter types available right now from Purolator. Before you consider special, custom made filters, let Purolator know your filtration problem. Write Purolator Products, Inc., 970 New Brunswick Ave., Rahway, N. J.

There's a Purolator filter for every known fluid

Filtration For Every Known Fluid

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PRODUCTS, INC.

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Agents in principal cities.

For more facts circle 581 on Reply Card

New from Standard Oil

RYKON

GREASE

Standard scores major breakthrough in grease technology to bring you better lubrication . . . help you make important savings in grease use, application and inventorying.

Scientists at Standard Oil have developed a new non-soap, organic, grease thickening agent. This, plus other improvements in grease formulation, is now available in a new line of Standard greases named RYKON.

Mechanical stability—RYKON Greases show little change in consistency even under severe working.

Oxidation stability—Exclusive thickener in RYKON Greases inhibits oxygen absorption. This prevents costly corrosive action on bearings.

Water resistance—Extremely resistant to water washout.

High temperature stability—RYKON Greases have an ASTM dropping point of 480° F. They have exceptional heat stability.

Resistance to change—RYKON Greases remain soft and grease-like at sustained high temperatures, continue to give thorough lubrication.

Low temperature stability—RYKON Greases work readily at low temperatures, lubricate from a cold start.

Oil separation—RYKON Greases exhibit strong resistance to bleeding.

Rust preventive properties—RYKON Greases demonstrate superior natural qualities in prevention of rust.

To meet specific grease lubrication problems, greases in four Regular and three Heavy Duty grades are available. With a single RYKON multi-purpose grease doing all jobs in the plant, there's no wrong grease to use. Money invested in grease inventories is cut, storage and application facilities are reduced. Maintenance training is simplified.

Get the facts about RYKON Greases from the industrial lubrication specialist at the Standard Oil office nearest you in any of the 15 Midwest and Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD

STANDARD OIL COMPANY
(Indiana)

For more facts circle 582 on Reply Card

When It Comes to Humidification . . .

Here is some information to consider:

Automatic Armstrong Steam Humidifiers give large humidifying capacity at low cost —by discharging clean, dry steam directly into room atmosphere, or into the air stream in ducts or plenums. Control is by accurate humidistats. Connections are made directly into steam supply and return lines, and to 110 or 220 volt electrical circuits.

Pneumatic controls also are available.

Advantages of Armstrong Steam Humidifiers

1. Uniform, Accurate Control. Armstrong Steam Humidifiers give humidity control throughout the room to within 2 to 4% of humidistat setting.

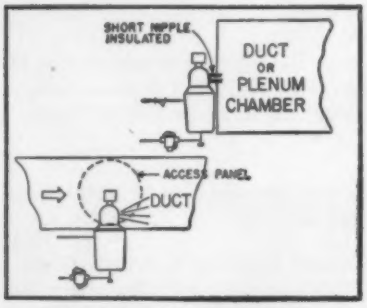
2. No "Fall-out" of Water or Mineral Dust. No water droplets come out of an Armstrong humidifier because the inner chamber is steam-jacketed to evaporate any condensation. And, dry steam leaves no mineral residue to settle out of the air.

3. Easy to Install. Installation of units is similar to that of unit heaters. For simple duct and plenum installations, see Fig. 2.

4. Dependable Quality, Minimum Maintenance. Fan motor bearings are oilless type . . . never need lubrication. Solenoid coils are glass wound. Valves and humidistats are designed for years of service. Simple, sturdy construction means minimum maintenance.

5. Moderate Initial Cost. Mass production and simplicity of design provide a high-quality unit at a moderate price.

6. Low Operating Cost. The cost of steam for humidification to 50% relative humidity at 70°F. averages no more than 1¢ per 1000 cubic feet of space for a 24-hour day. And the load on the boiler is no greater than the heating load required to evaporate a water spray. The cost of electricity for the fan is as little as ¼ cent per day where the rate is as high as 3 cents per kilowatt hour.



Duct and plenum chamber installations

TYPICAL HUMIDITIES FOR VARIOUS PURPOSES

Room	*% RH*
Offices (Health & Comfort)	35-45
IBM Rooms	50
Paper Fabricating & Storage	40-50
Wood Processing	35-50
Leather Storage	40-60
Static Control	50
Food Storage	35-90
Printing Pressroom	45-55

Types Available

ELECTRICALLY OPERATED:

Types C-2 and C-3—These two humidifiers are identical except for size and capacity. The C-2 lists at $170 complete (with fan, humidistat, strainer and steam trap); its capacities for various conditions are listed in the table below. The C-3 (list price $295 complete) has a capacity more than double that of the C-2.

Type VC-2 and VC-3—Similar to C-2 and C-3, but without fans, relying on the velocity of the steam jet for dispersion. At pressures from 5 to 15 lbs. a venturi nozzle is provided. VC-2 lists at $145, VC-3 at $259.50.

Type MC-2—This unit is not automatic, having a manual shut-off valve. List price is $105.25 with venturi, $132.75 with fan.

Type CK-4—A large capacity unit for connection to central heating ducts or large floor-type unit heaters. Automatic humidistat control. Capacity is 6 to 16 times as great as the C-2, depending on pressure. List price is $545.

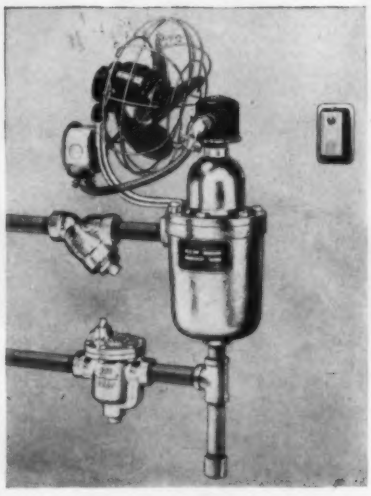
AIR OPERATED AND CONTROLLED:

Types DA-32, DA-33 and DA-34—just like the C-2, C-3, and CK-4, but with pneumatic humidistats and air-operated valves.

C-2 CAPACITIES

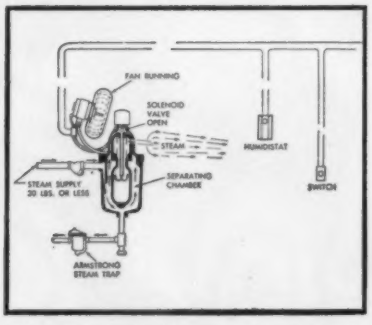
(Maximum cubic feet of space humidified by one Armstrong C-2 Humidifier at 75°F indoor temperature and 0°F, 75% RH outdoors—2 air changes per hour)

Steam Pressure At Humidifier	Humidifier Capacity Lbs./hr.	Relative Humidity To Be Maintained							
		35%	40%	45%	50%	55%	60%	70%	80%
5	42	49,000	43,000	37,000	33,000	30,000	27,000	23,000	20,000
10	60	70,000	61,000	54,000	48,000	43,000	39,000	33,000	29,000
20	65	77,000	66,000	58,000	52,000	47,000	42,000	36,000	31,000
30	76	90,000	77,000	68,000	60,000	54,000	50,000	42,000	36,000



HOW THEY WORK

When relative humidity drops slightly below desired level, humidistat activates solenoid valve, which admits steam into separating chamber and thence to room atmosphere. Fan helps disperse steam. When relative humidity reaches desired level, humidistat closes valve and stops fan.



For Details, Prices and Assistance

Your local Armstrong Representative will be glad to give you complete details and prices, and help you survey and plan your humidification job—at no cost or obligation on your part. Or you yourself can make the survey, with the help of information given in Armstrong Bulletin 500.

For Complete Information

SIXTEEN-PAGE BULLETIN NO. 500 contains a wealth of information about humidification. Tells: how relative humidity affects products and your profits . . . other effects of relative humidity . . . recommended humidities for various operations . . . advantages of Armstrong Steam Humidifiers . . . how present users have profited . . . complete data and prices on all Armstrong humidifiers . . . selection and installation data. To get your copy, just call your local Armstrong Representative or write:

ARMSTRONG MACHINE WORKS
9122 Maple Street
Three Rivers, Mich.

For more facts circle 583 on Reply Card

WHY LOSE $ $ FROM RADIANT HEAT LOSSES IN LONG HOT WATER LINES...

?

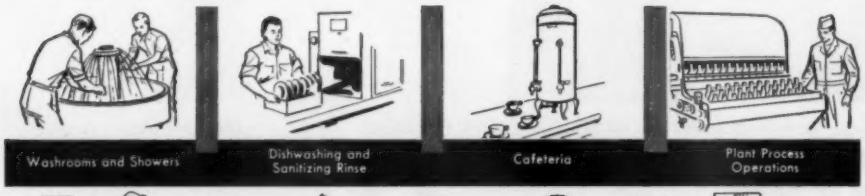
A.O.Smith

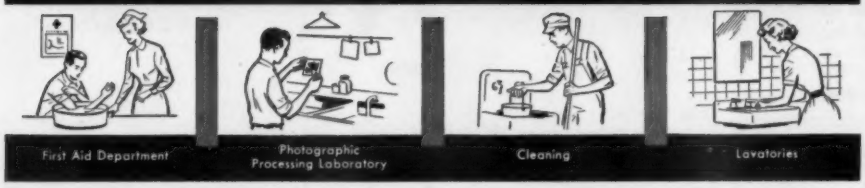
Burkay

INDUSTRIAL GAS-FIRED

WATER HEATERS

can be "spotted" wherever hot water is needed





Save on BTU's . . . Save on Dollars . . . Save on Maintenance with Burkay Gas-Fired Automatic Water Heaters

Large cost reductions can be made in hot water generation by using *Burkay* units. Located strategically, *Burkay* water heater systems provide all the right temperature hot water required for general use and processing needs.

With *Burkay* heaters you cut back the operation of expensive boilers, and in some cases dispense with them entirely . . . thereby reducing overhead, labor, maintenance costs and long hot water lines.

As single units or in "banks" as required, *Burkay* water heaters meet all hot water demands economically.

Highly efficient heat exchanger, rust-free water, minimum of maintenance makes the *Burkay* a popular unit among plant managers. Call on your nearest A. O. Smith-*Burkay* distributor, or your local gas utility to help you.

Burkay industrial water heaters have all-copper waterways. Are rust-free, corrosion-free, leakproof. Are tested at 550 psi. Dependable. Sturdy construction. Compact. Economical operation. Operate on all gases. A.G.A. and A.S.M.E. approved. Completely automatic with suitable thermostats. Guaranteed by A. O. Smith, world's largest water heater manufacturer.

Write FOR COMPLETE INFORMATION

Through research ...*a better way*

A.O.Smith CORPORATION

PERMAGLAS DIVISION · KANKAKEE, ILLINOIS
International Division · Milwaukee 1, Wis.

A. O. Smith Corporation
Permaglas Division, Dept. PE-1157
Kankakee, Illinois
Gentlemen: Please send me booklet, "Hot Water for Industrial Plants."

Name.....Title.....
Company.....
Address.....
City.....Zone....State.....

makers of famous Permaglas® glass-lined water heaters... Permaglas® heating and cooling

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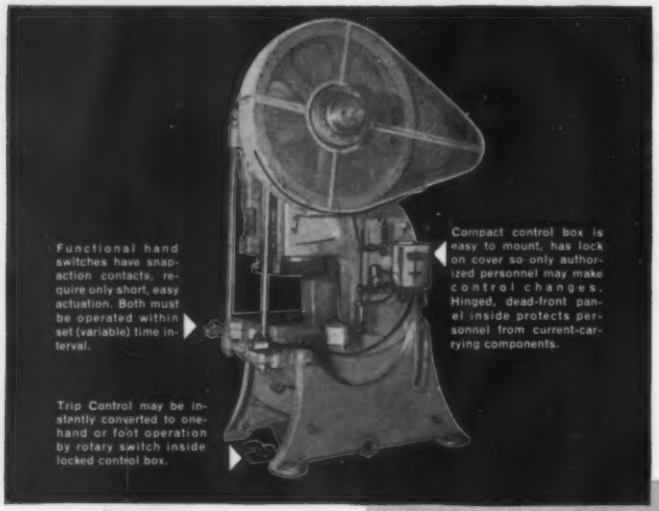
MICRO SWITCH . . . FIRST IN PRECISION SWITCHING


Functional hand switches have snap-action contacts, require only short, easy actuation. Both must be operated within set (variable) time interval.
Trip Control may be instantly converted to one-hand or foot operation by rotary switch inside locked control box.
Compact control box is easy to mount, has lock on cover so only authorized personnel may make control changes. Hinged, dead-front panel inside protects personnel from current-carrying components.

MICRO SWITCH TRIP CONTROLS

for more PRODUCTION with increased Safety

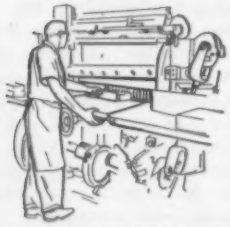
MICRO SWITCH Trip Controls have wide range of uses

These controls offer a choice of desirable single stroke control for positive mechanical clutch machines and automatic cycling control for friction clutches and hydraulic and pneumatic equipment.

FOR SMALL PRESSES

Provides faster, safer operation with less effort of small two-hand presses, riveting machines, etc.

FOR PAPER CUTTERS



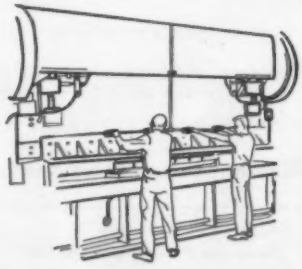
Complete protection is afforded operator in cutting or trimming either flat stock or labels.

WIDE VARIETY OF PRESS CONTROL METHODS AVAILABLE

1. One operator—two hands.
2. One operator—two hands or one foot.
3. One operator—two hands or either hand or one foot.
4. Two operators—one to four hands, any combination, or one foot.
5. Three operators—one to six hands, any combination, or one foot.
6. More than six hands, any combination, or one foot.

INCREASED PRODUCTION with INCREASED SAFETY

- Instant electrical response
- Feather-touch operation
- Easy control changes
- Decreased operator fatigue
- Two hand operation
- Cannot be "cheated"
- Interlock prevents power stroke while changing dies



FOR USE ON LARGE PRESSES

Makes operation of large presses and press brakes safe and less tiring. Any number of operator stations may be "wired into" the control circuit.

Let us send you complete information on MICRO SWITCH Trip Control and the name of the distributor nearest you.

SEND FOR CATALOG 65 TODAY

Gives complete description of all controls and clutch actuating equipment.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

For more facts circle 585 on Reply Card

Here's NEW mobile efficiency for YOU!

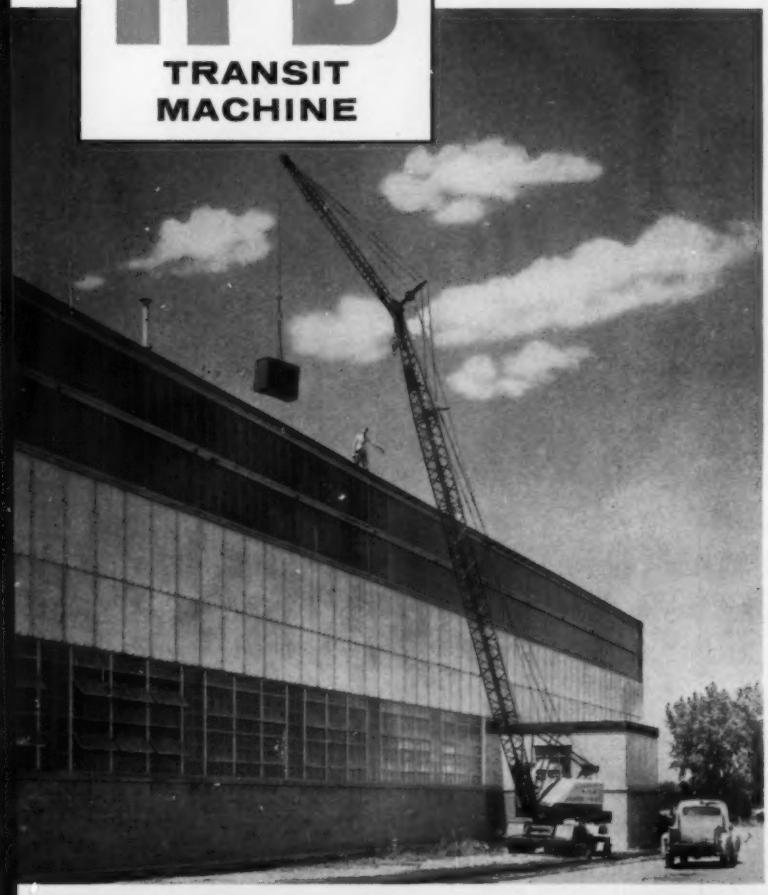
BUCYRUS-ERIE

11-B

TRANSIT MACHINE

CRANE
CLAMSHELL
DRAGLINE
HOE
SHOVEL

⅜-yd. excavator
10-ton lifting crane



In crowded yards or from plant to plant . . .

The NEW Bucyrus-Erie 11-B Transit Machine is ready to roll extra savings into your industrial materials handling program.

You'll profit from the 11-B's simple, compact design; from its versatility and economical operation. You'll find the 11-B provides new speed and mobility for efficient performance on lifting, digging, loading, erecting, and plant maintenance jobs. What's more the 11-B gives you time-saving accessibility for low cost maintenance.

The two-section cab provides ample room for the operator and features sliding, hinged, and removable panels that open to power plant and main machinery. Unit or bench assemblies in main machinery permit quick service and easy replacement, minimizing downtime.

Fill in the coupon below and drop it in the mail TODAY. Give us an opportunity to explain ALL the advantages of the 11-B's simple, easy-does-it-design. You can enjoy *unmatched quality at low cost* with this fast-moving, hard-working, easy-to-maintain mobile crane-excavator.

36BE57C

BUCYRUS ERIE

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BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

SEND FOR COMPLETE FACTS NOW!

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

Gentlemen: Please send me details on the new 11-B.

Name _____

Organization _____

Address _____

City _____ State _____

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don't waste steam

Nicholson steam traps have a powerful, intermittent valve action which closes the valve *completely*. Hardened stainless steel valve and seat are lapped and mated—there's no steam waste, no dribbling. And that's not all. With just one thermostatically-operated moving part, there's nothing to get out of order, nothing to go wrong. Nicholson means continuous and low-cost operation of your steam-using equipment . . . no downtime from trap failure.

- **high air-venting capacity . . . for faster warmup of equipment.**
- **small and lightweight . . . easy to pipe and support.**
- **each unit steam-tested before shipment.**

So, to get a trap that avoids waste, saves money, specify Nicholson. W. H. NICHOLSON AND COMPANY, 14 OREGON ST., WILKES-BARRE, PA. *Sales and Engineering offices in 98 principal cities.*

Write for Bulletin 1055

NICHOLSON
of Wilkes-Barre

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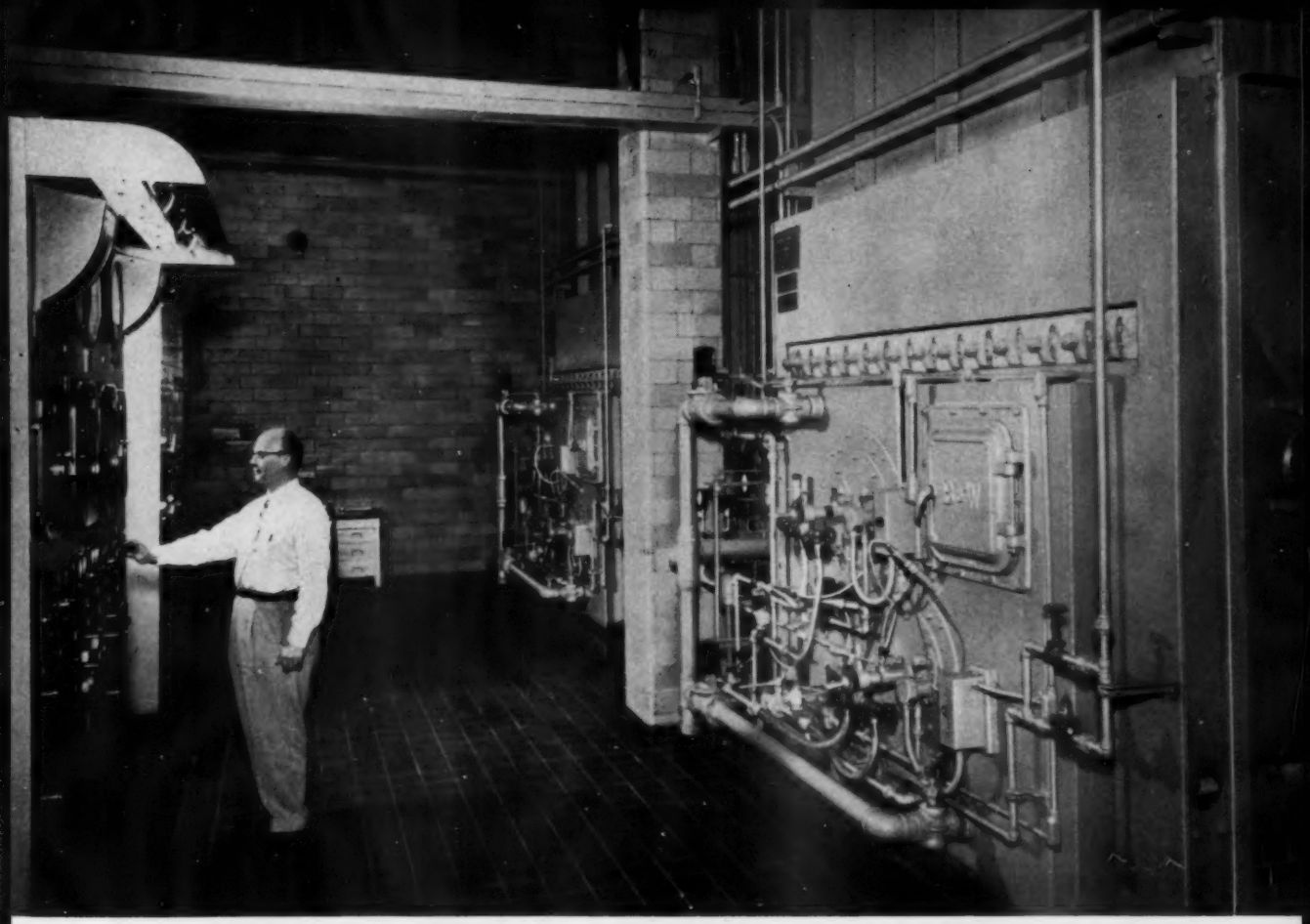
For more facts circle 588 on Reply Card ⟶



Hospitals Turn to B&W Integral-Furnace Boilers for Reliable Supply of Clean, Dry Steam

Every day, year after year, even the routine activities of a hospital are vital. The continuous, reliable services expected from hospitals must be matched by the equipment upon which they depend.

Institutions like St. Mary's Memorial Hospital at Knoxville, Tenn., have come to depend upon the reliability and continuity of operation offered by B&W Integral-Furnace Boilers. Cleanliness of operation, high fuel economies, and maximum capacity in small boiler room space are other benefits of these units which appeal to health and budget-conscious hospital management.

Modern, efficient steam supply with ample capacity for future needs, which include a new 105-bed wing and 150-bed nurses' residence with classrooms and auditorium, are being provided at St. Mary's Hospital by two new B&W Boilers.

Flexibility of the B&W Integral-Furnace design is another of the many reasons why St. Mary's and scores of other hospitals throughout the country have selected B&W. The new boiler at Knoxville is oil and gas-fired, with provision made for the installation of a stoker for future coal firing.

Rapid response to steam demands, dependable supply of clean, dry steam, and the ready availability of a nationwide service staff, have given B&W Boilers preference among those who specify and buy for hospitals and institutions throughout the nation.

B&W provides a single responsibility in design, engineering, manufacturing, installation, and service through a national network of plants and engineers.

The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

Two B&W Integral-Furnace Boilers at St. Mary's Hospital have capacity of 30,000 lb. of steam per hour each at operating pressure of 110 psi. Design pressure of 160 psi. Architect: David B. Liberman, Knoxville, Tenn. Consulting Engineer: Albert F. G. Bedinger, Knoxville, Tenn.

G-851-FF

BABCOCK & WILCOX

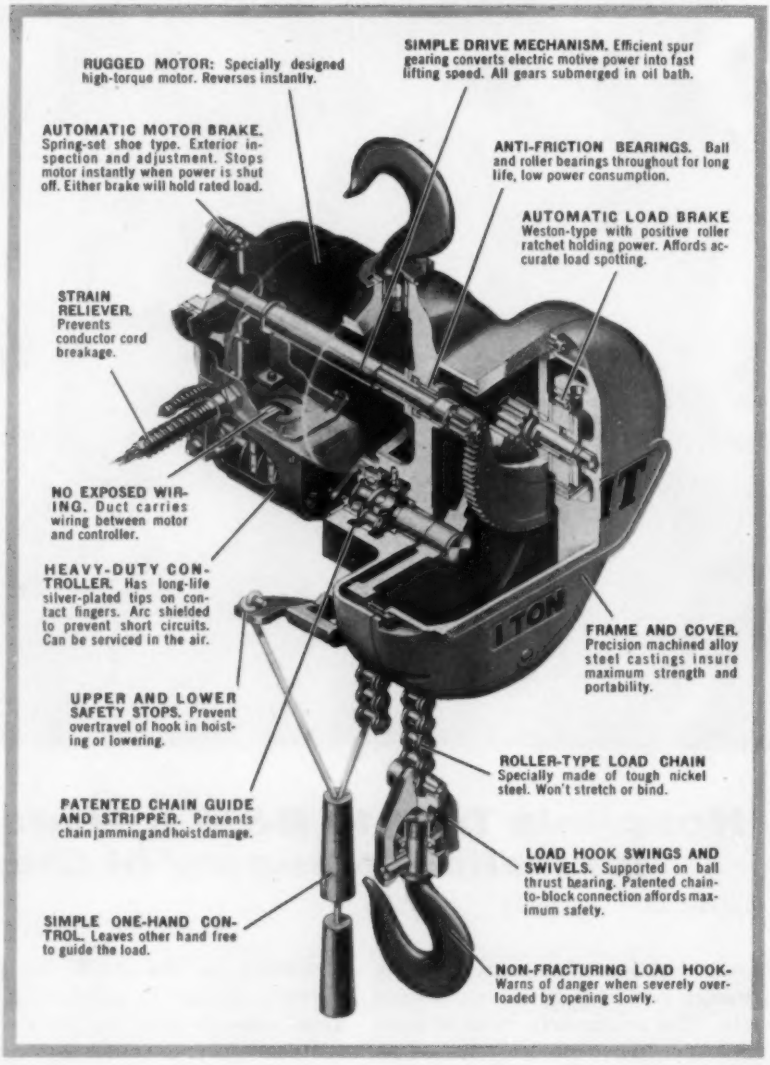
BOILER DIVISION

CLOSE LOOK AT 'Budgit'®

. . . THE MOST WIDELY USED ELECTRIC HOIST

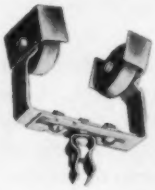
There is no substitute for the economy of quality. That is why the 'Budgit' Electric Hoist is by far the No. 1 hoist in its class. Superb quality inside and out assures: 1) consistently high performance; 2) all-day operation on just a few cents' worth of electricity; 3) long service life with little maintenance.

The 'Budgit' Electric Hoist is a complete hoist — comes ready to hang up, plug in and use. It is fast — a 500 lb. load can be lifted a foot in less than two seconds. It is safe — has every practical feature to protect operator, load and hoist. Capacities: ⅛ to 2 tons. AC and DC models. Also available for operation from one 12-volt or two 6-volt truck batteries — can be installed on utility trucks or used where there is no regular electric service. Prices start at $149. Get all the facts. *Ask your "Shaw-Box" Distributor or write us for Bulletins 402 and 404.*


RUGGED MOTOR: Specially designed high-torque motor. Reverses instantly.
SIMPLE DRIVE MECHANISM. Efficient spur gearing converts electric motive power into fast lifting speed. All gears submerged in oil bath.
AUTOMATIC MOTOR BRAKE. Spring-set shoe type. Exterior inspection and adjustment. Stops motor instantly when power is shut off. Either brake will hold rated load.
ANTI-FRICTION BEARINGS. Ball and roller bearings throughout for long life, low power consumption.
AUTOMATIC LOAD BRAKE Weston-type with positive roller ratchet holding power. Affords accurate load spotting.
STRAIN RELIEVER. Prevents conductor cord breakage.
NO EXPOSED WIRING. Duct carries wiring between motor and controller.
HEAVY-DUTY CONTROLLER. Has long-life silver-plated tips on contact fingers. Arc shielded to prevent short circuits. Can be serviced in the air.
FRAME AND COVER. Precision machined alloy steel castings insure maximum strength and portability.
UPPER AND LOWER SAFETY STOPS. Prevent overtravel of hook in hoisting or lowering.
ROLLER-TYPE LOAD CHAIN Specially made of tough nickel steel. Won't stretch or bind.
PATENTED CHAIN GUIDE AND STRIPPER. Prevents chain jamming and hoist damage.
LOAD HOOK SWINGS AND SWIVELS. Supported on ball thrust bearing. Patented chain-to-block connection affords maximum safety.
SIMPLE ONE-HAND CONTROL. Leaves other hand free to guide the load.
NON-FRACTURING LOAD HOOK- Warns of danger when severely overloaded by opening slowly.
1 TON

'Budgit' I-Beam Trolley. Extends the operational range of the hoist. Adjustable to fit various I-beam sizes. Ball bearing equipped for smooth operation. Hand-geared type saves pushing effort. Capacities ¼-ton up.

'Budgit' Current Collector Assembly. For mounting on the 'Budgit' Trolley. Picks up current from bare copper trolley wire used to supply the hoist with power.



'Budgit' Conductor Cord Trolley. Used in any number to keep the conductor cord up and out of the way when the hoist is installed on a monorail. Equally suitable to hold cords on other devices aloft.

57A-11

'Budgit'® ELECTRIC HOISTS

MAXWELL MM& MOORE INC. MANNING TRADE MARK

MANNING, MAXWELL & MOORE, INC.

SHAW-BOX CRANE & HOIST DIVISION

362 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: *Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.*

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NOW, From General Electric . . .

A MAJOR INNOVATION IN SWITCH AND FUSE EQUIPMENT DESIGN

General Electric's new load-break Rollout Switch and Fuse equipment—available in 2.4, 4.8, 7.2, and 13.8 kv and with a high momentary rating—provides maximum safety for your personnel, plant, and equipment.

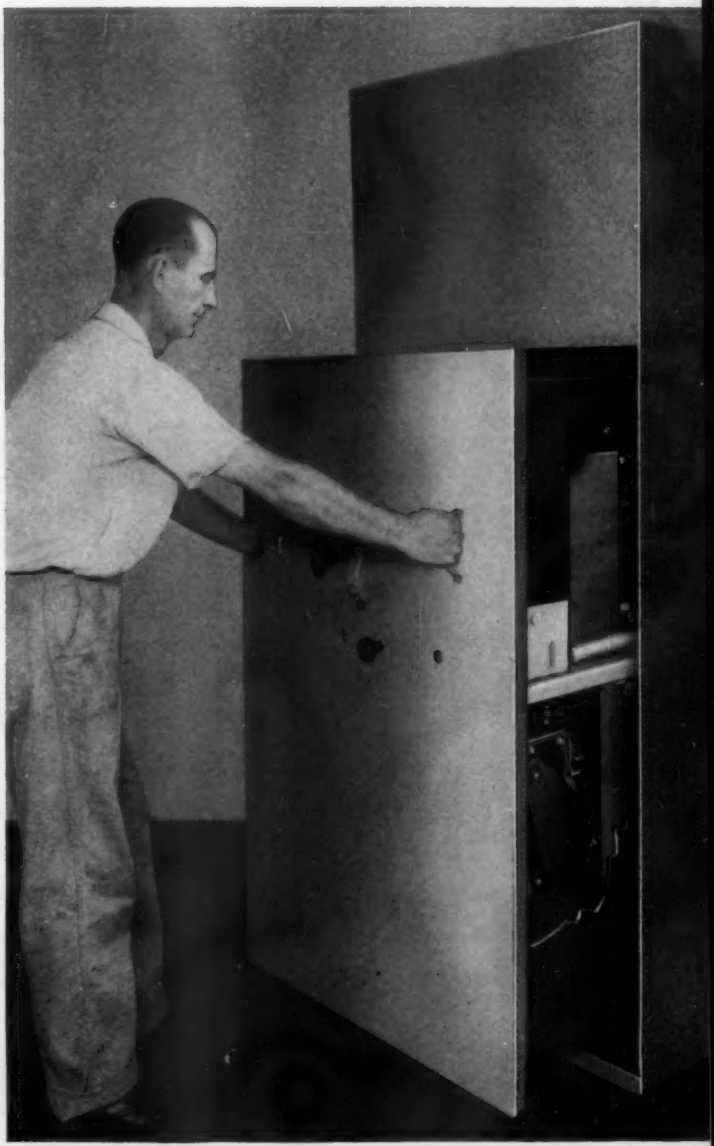
SAFER, BETTER CLOSING against full momentary current is provided with the new General Electric equipment by a stored energy closing mechanism.

MAXIMUM SAFETY for inspection and maintenance is provided by the rollout feature of the new General Electric equipment.

MAXIMUM PROTECTION is built into General Electric's equipment through a time delay interlock that prevents immediate re-opening of the switch after closure. This allows time for the fuses to function if the switch has been closed against a fault.

MAXIMUM VERSATILITY is possible with General Electric's Rollout Switch and Fuse because the equipment is available as an indoor or an outdoor unit. Either type can be furnished single, multiple, or in a line-up with metal-clad switchgear.

FOR MORE INFORMATION contact your General Electric Apparatus Salesman, or write to Section 511-27, General Electric Company, Schenectady 5, New York.



ROLLOUT FEATURE simplifies maintenance. Insulation is shown cutaway to give position of switch and fuse elements.

Progress Is Our Most Important Product

GENERAL ELECTRIC

For more facts circle 590 on Reply Card

Find hundreds of ways to improve the efficiency of your plant in just 4 days

1958 NATIONAL PLANT MAINTENANCE & ENGINEERING SHOW AND CONFERENCE

International Amphitheatre, Chicago

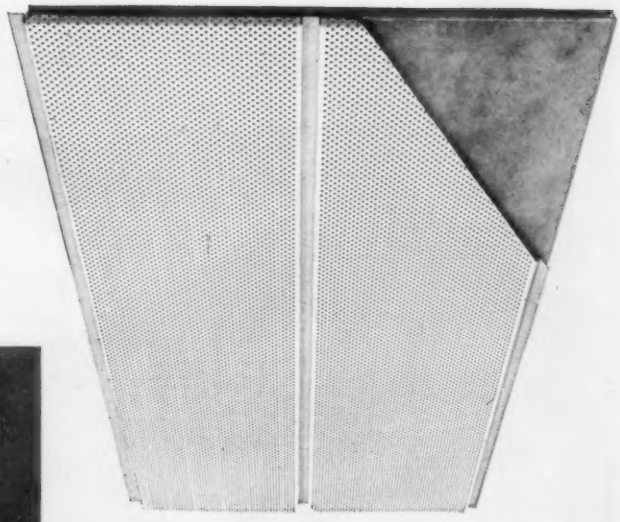
January 27 to 30, 1958

- **Over 400 manufacturers**
- **Over 120,000 square feet of exhibits of cost-cutting equipment and services**

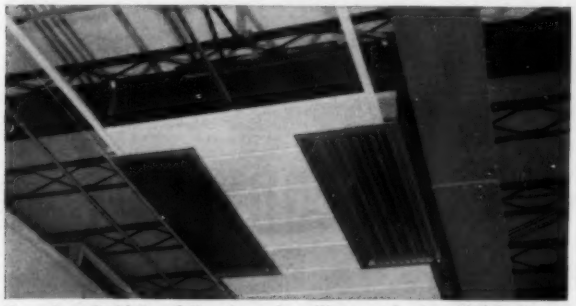
For free registration cards for the show and information about the conference write:

Show Management
Clapp & Poliak, Inc.
341 Madison Avenue
New York 17, New York

PANELCOUSTIC
for long-run acoustical savings



Panelcoustic panels can be cut to fit snugly around air diffusers like the ones shown above.



Complete Gold Bond Panelcoustic ceiling can be installed in hours. Overhead utilities are out of the way, yet instantly accessible.

Big panels are supported on Tee carrying runners and can be positioned with finger-tip ease. Installed cost is comparable to other incombustible acoustical systems.

GOLD BOND PANELCOUSTIC offers *two-way economy* for acoustical ceilings in your plant. The big 2′x4′ panels go up faster (installation savings) and the baked enamel finish can be quickly wiped clean (maintenance savings).

Each perforated metal panel is backed with an *incombustible* mineral wool pad. You can specify pad thicknesses to absorb from 60% to 90% of the sounds that strike the panel.

For opening up large areas to service overhead utilities, Panelcoustic panels are simply *pushed up and out* of Tee runners. When specified, air diffusers can be installed *above* the Panelcoustic panels.

Inverted ribs on each panel give added rigidity and form a distinctive pleasing channeled pattern. Your maintenance men simply wipe Panelcoustic clean with a soapy sponge, although you may repaint for a change in color scheme *without* affecting acoustical efficiency.

For full information on Gold Bond Panelcoustic Ceilings, refer to Section 3i/Na of Sweet's Industrial Construction File, call your local Gold Bond® Acoustical Contractor or write Dept. PE-117, National Gypsum Company, Buffalo 2, New York.

ACOUSTICAL CEILINGS

NATIONAL GYPSUM COMPANY

Gold Bond
BUILDING PRODUCTS

For more facts circle 592 on Reply Card

Alcoa Approved Applicator: F. E. Smith, Inc., Philadelphia, Pa.

FIVE OPEN-HEARTH OVENS CAN'T COOK THIS ALCOA ALUMINUM ROOF!

Intense heat, searing gases and fumes have failed to faze this Alcoa® Aluminum Corrugated Roof. The roof remains as strong and useful as the day it went up! And no maintenance has been necessary.

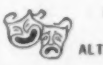
Equally important from the maintenance standpoint, this Alcoa Roof went up fast at amazingly low cost per square foot.

The practicality and economy of Alcoa Industrial Building Products for plant maintenance and expansion are worth knowing about. Corrugated and V-beam roofing and siding, and ribbed siding sheet—even corrugated sheet for conveyors—are but a few of the tested and proved low-cost, maintenance-free ways to improve your plant.

Your nearest Alcoa sales office will gladly furnish complete information and put you in touch with an Alcoa Approved Applicator if you wish. Or write: Aluminum Company of America, 858-L Alcoa Building, Pittsburgh 19, Pa.

FREE SAMPLE

In fact, your choice of two samples! Alcoa has a limited supply of samples of (1) Corrugated Sheet and (2) Embossed Corrugated Sheet. Make your choice and send for this remarkable material today!



NEW!
"ALCOA THEATRE"
Exciting Adventure
ALTERNATE MONDAY EVENINGS

ALCOA ALUMINUM
INDUSTRIAL BUILDING PRODUCTS
ALUMINUM COMPANY OF AMERICA

Your Guide to the Best in Aluminum Value

For more facts circle 593 on Reply Card

Asbestone Panels add insulation to curtain walls, and privacy to office space

With Gold Bond ASBESTONE PANELS, you can plan for the strength and permanency of stone in both exterior curtain walls and movable office partitions. These versatile, easy-to-handle panels help make planning simpler, help make construction more economical.

ASBESTONE PANELS are made of Asbestos-Cement sheets, laminated to both sides of a structural insulation core that's asphalt-inpregnated and chemically-treated to resist weather, moisture, mildew and rot. Fire-resistant ASBESTONE PANELS are four feet wide — available in 6′, 7′, 8′, 9′, 10′ and 12′ lengths...in four thicknesses. A size or thickness for every building recommendation.

CURTAIN WALLS of Gold Bond ASBESTONE PANELS save your clients' money in initial costs *and* in maintenance. They resist corrosive and acidic fumes, are fire and rot-resistant.

EXTRA STRENGTH AND INSULATION. Gold Bond ASBESTONE PANELS add extra strength and insulation when used with other curtain wall materials such as Gold Bond Corrugated "400."

MOVABLE OFFICE WALLS—to give client personnel the privacy they need *and* keep office layouts flexible. Far less expensive than permanent partitions—*and* they help reduce office noise.

The surface of a Gold Bond ASBESTONE PANEL has the strength of rock. The core is Gold Bond® Insulation Board, made by an exclusive Fiberlok process that locks strength in, keeps heat transfer to a minimum.

Our new manual contains complete information for architects' reference in planning panelized curtain walls for factories, schools, hospitals... inside or outside use. For your copy, write Dept. PE-117, National Gypsum Company, Buffalo 2, New York.

ASBESTONE PANELS

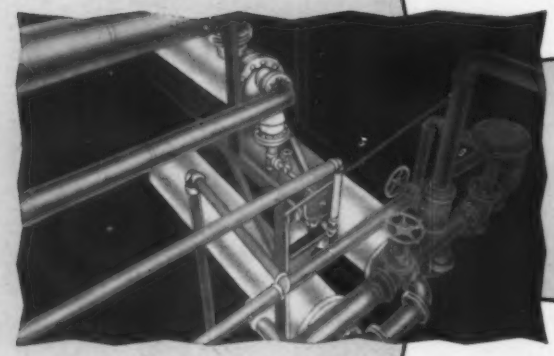
NATIONAL GYPSUM COMPANY

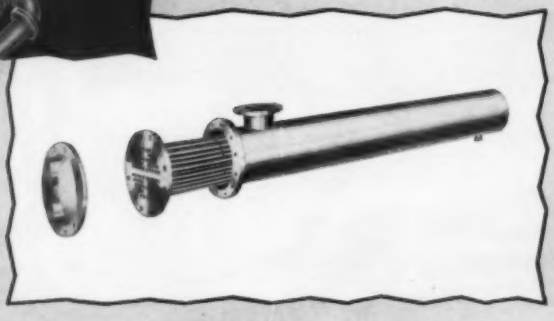
Gold Bond
BUILDING PRODUCTS

For more facts circle 594 on Reply Card

ENTIRE BUILDING NOW HEATED

WITH STEAM FORMERLY THROWN AWAY!





In this building a large industrial user of steam was dumping the condensate from their steam processing into a creek!

With the installation of the three Taco heat exchangers pictured, they are reclaiming enough steam to heat the entire 220′ x 560′ building.

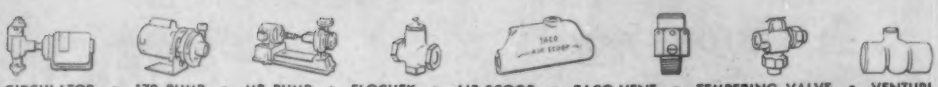
Perhaps you, too, have a problem involving the use of heat exchangers such as for heating water; showers; cafeterias; processing; snow melting; heating elevated outdoor tank; swimming pools; feed water heaters; condensate cooling; heating buildings remote from the main plant. You are invited to write us concerning *any* heat exchanger problem or application.

BETTER HEATING Taco BETTER WITH TACO **TACO**

HEATERS INCORPORATED

1160 CRANSTON ST., CRANSTON 9, RHODE ISLAND

Corporate Office: 342 Madison Ave., New York 17, New York
In Canada: Taco Heaters of Canada, Ltd., 4 Gilead Place, Toronto 2



CIRCULATOR • 170 PUMP • MP PUMP • FLOCHEK • AIR-SCOOP • TACO-VENT • TEMPERING VALVE • VENTURI

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UNLOADING 40-FOOT LONG structural steel columns, Breman Steel's American 300 Series yard crane averages 12,000 pounds per pick with a *flat boom*! Operator John Smith reports that the American Self Propelled Crane is, "More flexible than others and highly mobile, too".

AMERICAN YARD CRANE AVERAGES 6-TON LIFTS WITH FLAT BOOM!

In the yards of Breman Steel Company, an American 300 Series Crane proves its speed, versatility and mobility day after day. Working with a hook, the American Self Propelled Crane handles heavy steel beams—averaging 6-ton lifts. Equipped with a magnet, the crane loads a gondola of No. 2 scrap in 1½ hours for the Atlanta, Ga., firm. Extremely maneuverable, the 30-ton capacity crane moves easily, smoothly down narrow yard aisles to spot or pick up materials. The ability to work with a flat boom or move safely while carrying a capacity load proves the American's exceptional combination of balanced design and power. Highly responsive controls mean safe, accurate load handling!

A complete selection of interchangeable fronts—crane boom, grapple, clamshell, dragline, shovel or magnet—tailors American Self Propelled Cranes to *every* job in yards of all sizes! For magnet work American offers the exclusive, thumb controlled "over-excitation" that boosts magnet pickup capacity by as much as 20%.

A complete line of American Cranes meet the demands of every industry: crawler, truck and self propelled cranes offer capacities from ½ yard, 12½ tons to 1½ yards, 50 tons; American Locomotive Cranes—capacities to 80 tons; big American Revolvers—capacities to 400 tons! For information on the American crane to perform your job best—for the name of your nearest distributor—fill out and mail this coupon:

AMERICAN HOIST
and Derrick Company
1882-1957 **75** *years of service*
St. Paul 7, Minnesota

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AMERICAN HOIST and Derrick Co.
Saint Paul 7, Minnesota

Our operations require _____ ton lifting capacity—
please send catalogs on American

☐ Self Propelled ☐ Truck ☐ Crawler Cranes that meet this specification

NAME _____ TITLE _____

FIRM _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

Do you worry about the cost of wiring that new power distribution system

ON A SUNDAY AFTERNOON?

Sure, new power systems cost plenty — and it takes close figuring to get maximum results at reasonable prices. But you don't have to worry about getting dependable wiring at the right price — an armored cable and rack system using Rockbestos A.V.C.* Interlocked Armored Cable is your best solution. Here's why:

- Rockbestos A.V.C. Interlocked Armored Cable gives more current capacity than cable in conduit or other armored cable.
- Rockbestos A.V.C. Interlocked Armored Cable eliminates the need for costly conduits or ducts — it's easily installed on racks or hangers.
- Less layout time — less installation time mean important dollar savings.
- It permits planning for future installations — again at minimum cost.

Get full details on dollar saving Rockbestos A.V.C. Interlocked Armored Cable — write now for complete specification and application data.

ROCKBESTOS PRODUCTS CORPORATION

NEW HAVEN 4, CONNECTICUT | NEW YORK, CLEVELAND, CHICAGO, PITTSBURGH, LOS ANGELES, DETROIT, ST. LOUIS, ATLANTA, DALLAS, OAKLAND, SEATTLE

*A.V.C.-Asbestos, varnished cambric insulated. Single conductors are standard N.E.C. Type AVA power cables.

ROCKBESTOS

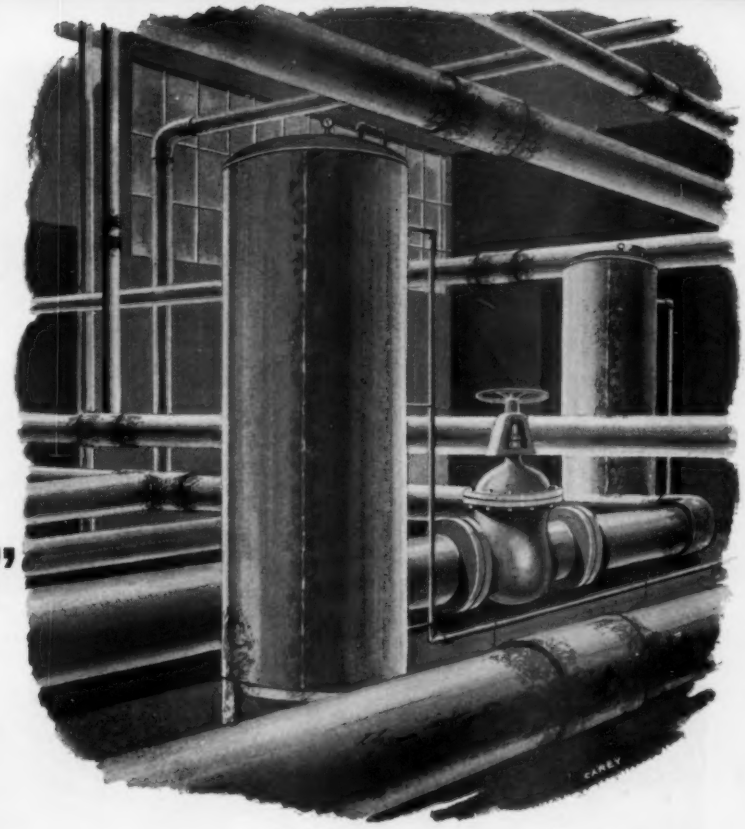
A. V. C. Interlocked Armored Cable

For New Buildings, Expanding Existing Circuits, Relocating Old Circuits

For more facts circle 597 on Reply Card

Protective coating failures usually begin with

"TROUBLE SPOTS"



Investigate the special properties of

Copon®

Severe corrosion problems solved with COPON include...

- Internal or external protection of pipes, tanks and vessels from solvents such as Aliphatic or Aromatic Hydrocarbons, Ketones, Esters and Alcohols.
- External protection of pipes, tanks and structures from heat, high humidity and chemical fumes.
- Protection of cooling tower headers, air washers and heat exchangers.
- Protection of production equipment from the severe corrosive action of cutting coolants.

COPON coatings provide superior protection for seams, welds, sharp edges and other corrosion "trouble spots." They provide higher film build-up per coat and cling tenaciously to metals and alloys. They last longer, because Copon remains tough and elastic even when subjected to chemical fumes, heat and high humidity. And they are less likely to be mechanically damaged, because Copon offers greater abrasion resistance than most protective coatings.

Easily applied by brushing or spraying, there is a selection of Copon coatings designed to solve or prevent severe corrosion problems. They have been used successfully to protect offshore drilling rigs, internally coat new and used pipelines, stop corrosion losses in chemical plants and paper mills, and in many other installations where corrosion costs were skyrocketing.

Copon®

FOR CORROSION CONTROL

For complete information on Copon, write on your company letterhead to the manufacturer located nearest your city.

ALLIED PAINT MFG. COMPANY
P. O. Box 1088, Tulsa, Okla.

BENNETT'S
65 W. First South St.,
Salt Lake City 10, Utah

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42nd & Linden Sts., Oakland 8, Calif.
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BRITISH AMERICA PAINT CO., LTD.
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BROOKLYN PAINT & VARNISH CO., INC.
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COAST PAINT & LACQUER CO.
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P. O. Box 3206, S. H. Station,
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KOHLER-McLISTER PAINT CO.
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McDOUGALL-BUTLER CO., INC.
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JAMES B. SIPE and COMPANY, INC.
P. O. Box 8010, Pittsburgh 16, Pa.

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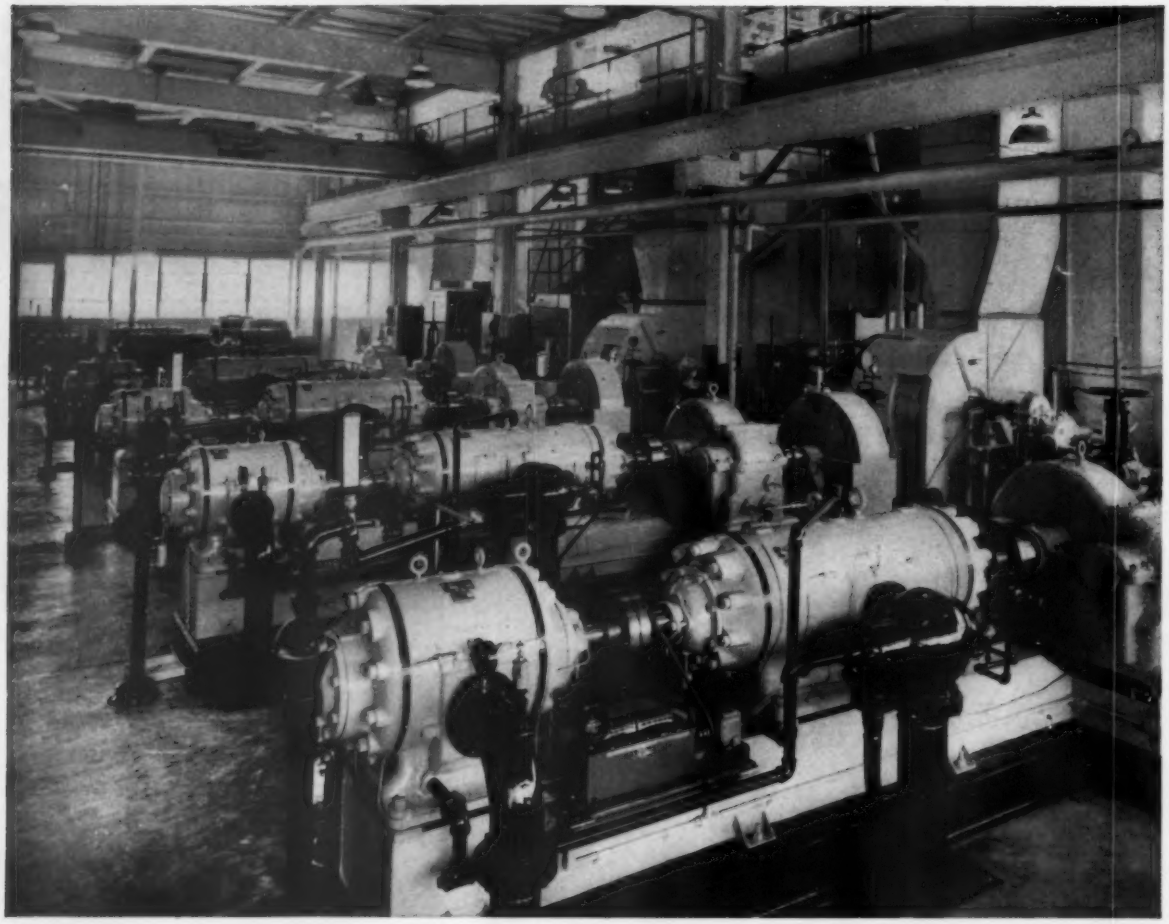

4 YEARS - - 25,000 HOURS OPERATING PERFORMANCE!

This is just one of many production records set by Fuller Rotary Compressors—in this case by each of six machines installed in a leading aircraft plant. The only maintenance or replacement necessary over this period was installation of high and low pressure blades. Bearings held up 100%.

Fuller rotary compressors shown are four C-300-300H, steam turbine drive, capacity each 1248 to 1805 c.f.m., with speed ranges of 450 to 650 r.p.m., 125-lb. gauge pressure, and two electric motor drive, capacity each 1663 c.f.m., at 600 r.p.m., 110 lb. gauge pressure.

Your plant, too, can take advantage of the many cost-saving advantages of Fuller rotary compressors; such as smooth airflow, lack of vibration minimum of moving parts, adaptability to any production setup, and the advantage of "one man" operation.

Write today to Fuller Company and get complete data on how Fuller rotary compressors can give you more air power at less cost.

Fuller

FULLER COMPANY GENERAL TRADE MARK

FULLER COMPANY C-312 4659

138 Bridge St., Catasauqua, Pa.

SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION

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PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930

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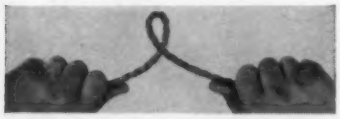
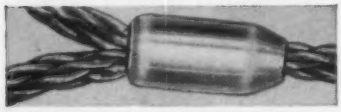
Only 2 Pounds of Tuffy Sling Per Ton of Load

The slings hoisting this hydraulic press are 1¼" Tuffy U-1s. For each 2 pounds of their own weight, two Tuffy U-1s of this length (basket hitch) are rated to handle a ton of load. Pound for pound Tuffys are weight lifters extraordinary.

The secret of the amazing strength of all Tuffy Slings is in the special purpose steel we use, and the way its wire fabric is machine-braided to give a combination of toughness and flexibility you won't find in any other machine made sling.



Tuffy Slings are so flexible that kinks can be pounded out easily without sling damage. And it's mighty hard to kink a Tuffy Sling in the first place. Tuffy's resistance to knotting, kinking and looping is just one reason why Tuffy Slings have an enviable record of giving longer service life than ordinary slings. For another reason, look at the Tuffy ferrule...



Tuffy's pressed-on ferrule gives the tucked eye splice 100% of fabric strength. Applied under great pressure, the steel ferrule literally flows into every space between the wires and strands, developing friction force equal to fabric strength. Another reason why you can't match Tuffy for taking deadloads, shocks and impacts!

Your Tuffy Distributor is Stocked to Meet Your Needs

He'll help you save money with the longer trouble-free service life of Tuffy Slings. He's ready with your Tuffy Slings and Union Wire Rope needs. Get in touch with him now!

FREE— Get Your Tuffy Sling Handbook

Gives complete data on Tuffy Sling types, dimensions, weights and rated loads. Plus a complete rigger's manual and engineer's notebook on wire rope constructions and specifications. Write us for your copy!

union Wire Rope corp.

2272 Manchester Avenue, Kansas City 26, Mo.

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

(25)

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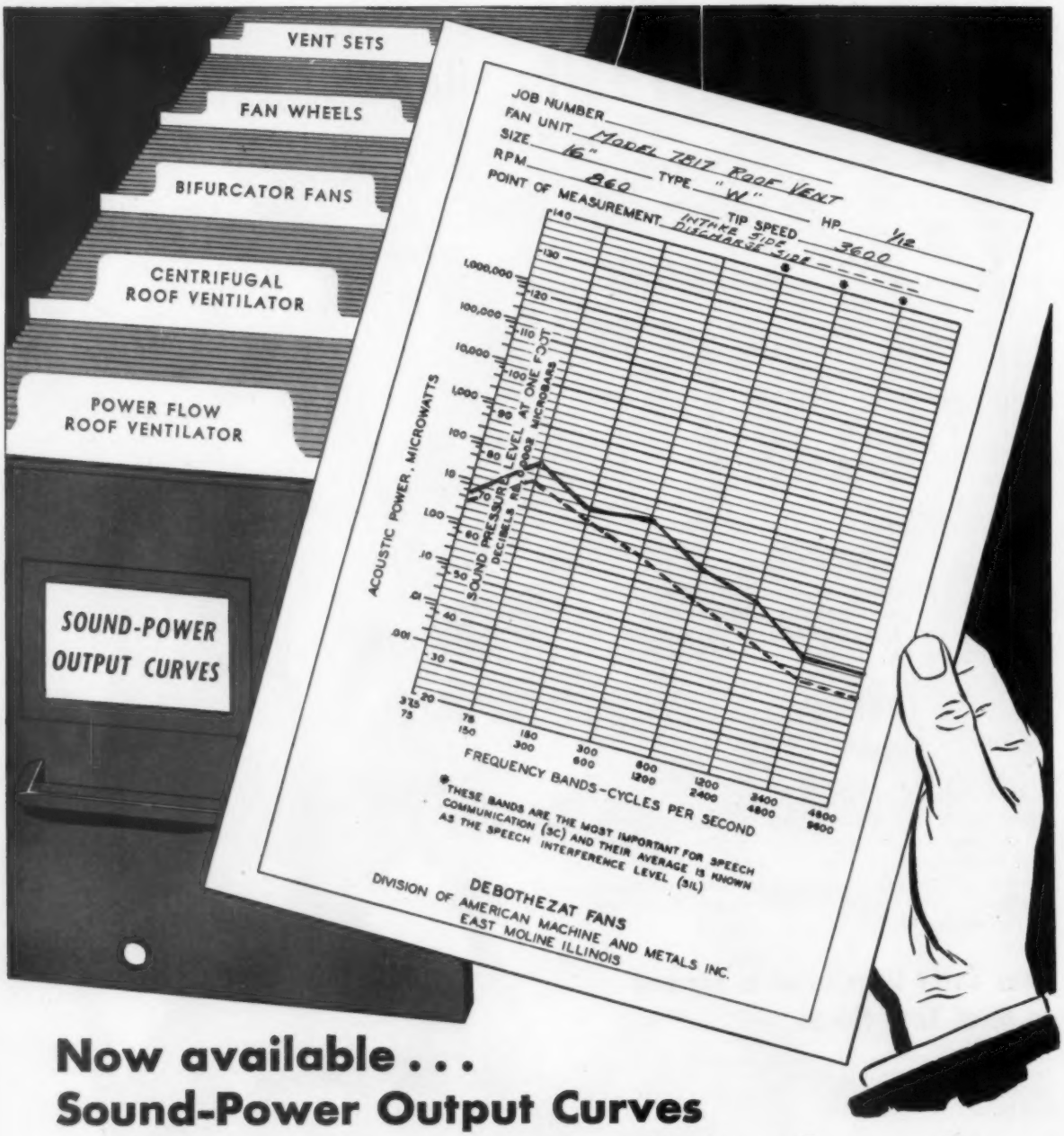
VENT SETS
FAN WHEELS
BIFURCATOR FANS
CENTRIFUGAL ROOF VENTILATOR
POWER FLOW ROOF VENTILATOR
SOUND-POWER OUTPUT CURVES
JOB NUMBER
FAN UNIT Model 7817 Roof Vent
SIZE 16" TYPE "W" HP 1/12
RPM 860 TIP SPEED 3600
POINT OF MEASUREMENT Intake Side Discharge Side
ACOUSTIC POWER, MICROWATTS
SOUND PRESSURE LEVEL AT ONE FOOT DECIBELS RE .0002 MICROBAR
FREQUENCY BANDS-CYCLES PER SECOND
*THESE BANDS ARE THE MOST IMPORTANT FOR SPEECH COMMUNICATION (SC) AND THEIR AVERAGE IS KNOWN AS THE SPEECH INTERFERENCE LEVEL (SIL)
DEBOTHEZAT FANS
DIVISION OF AMERICAN MACHINE AND METALS INC.
EAST MOLINE ILLINOIS

Now available . . . Sound-Power Output Curves by Octave Bands for predicting fan noise

All DeBothezat fans are rated for noise on both the inlet and outlet sides.

These ratings are given in microwatts sound power and decibel sound pressure levels in each of 8 octave bands of frequencies, measured separately. Ratings are established by actual scientific tests conducted in DeBothezat's own reverberation rooms designed and calibrated by Armour Research Foundation.

This data is available on any size and type DeBothezat fan unit you may be interested in. And remember, DeBothezat fans' sound power ratings are based on actual reverberation room tests. Ask your DeBothezat Sales Engineer for complete information.

De Bothezat FANS

A DIVISION OF

American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

IN CANADA: Represented by DOUGLAS ENGINEERING CO., Ltd., Toronto • Montreal

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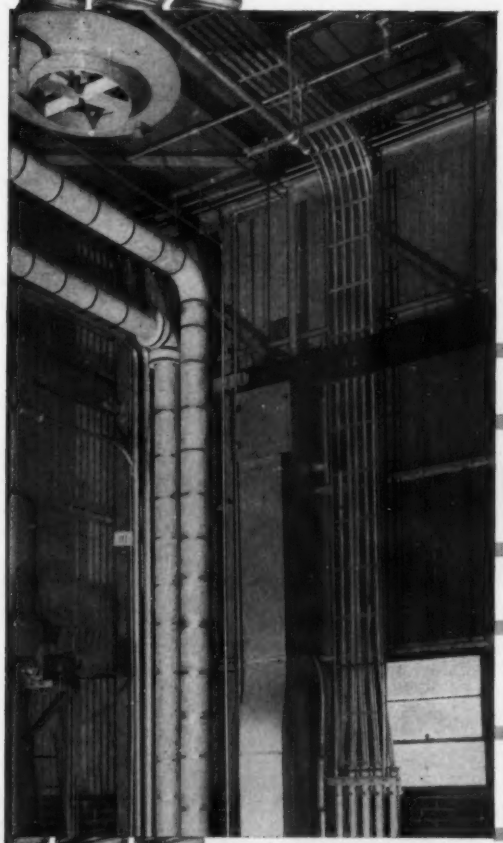
GENERAL CABLE

Interlocked Armored Cable



Typical industrial application showing ease of installation of Interlocked Armored Cable.

FOR EVERY CONDITION

Whether constructing a new plant or expanding present power needs, General Cable has the right Interlocked Armored Cable for every condition. Interlocked Armored Cable provides savings through reduction of space requirements and installed costs. Flexibility and accessibility facilitate relocation and extension of existing wiring systems and provide ease of maintenance and repair.

Where a flexible yet well protected cable system is required, it pays to specify General Cable Interlocked Armored Cable.

CONDUCTORS:	copper or aluminum in full range of sizes.
INSULATIONS:	varnished cambric, rubber (Thermax-W, Aquaseal, Gencorone, Butarone), polyvinyl chloride, polyethylene, asbestos-varnished cambric.
ARMORS:	steel, bronze, aluminum.
PROTECTIVE COVERING:	polyvinyl chloride jacket in colors over the armor can be furnished, where required.
VOLTAGE RATINGS:	full voltage range as covered by industry standards.

GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, N. Y.
Offices and Distributing Centers Coast-to-Coast.

for quality and service... **specify GENERAL CABLE**

For more facts circle 602 on Reply Card

Uses Skyway For Handling Materials AUTOMATICALLY

Completely Pays for Itself Every Three Years

Loading a van on the second floor of a building. This same van also may be lowered to the floor below for loading. Although the building at this end of the system is quite old, the Cleveland Tramrail equipment was easily installed.

For years this vast roof area did nothing more than provide protection from the weather. Now it is being used profitably for materials handling. Illustrated is the van emerging from the penthouse.

BY erecting a Cleveland Tramrail materials handling system over the roofs of its buildings, a large plant is able to transport materials between departments located in widely separated buildings at very low cost.

Because the system operates automatically, the Tramrail carrier travels back and forth without any operator. The carrier van is loaded or unloaded at convenient areas inside the buildings. Pressing a button sends it on its way. It rises vertically to a penthouse on the roof. Then it makes its run over the track system to the penthouse at the other end. Here it lowers to the floor inside for loading or unloading.

The system eliminates considerable floor traffic and saves space required for wide aisleways. It operates at any time, day or night. Inclement weather does not hinder it. The system requires only a fraction of the maintenance necessary for floor handling equipment. It does not wear or damage floors. It is a big aid to safety. In addition to these important benefits, the Cleveland Tramrail system makes tremendous time savings — enough to completely pay for the entire installation every three years.

Cleveland Tramrail has had wide experience in automatic dispatch materials handling systems of many types. Our engineers will welcome an opportunity to work with you.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

Cleveland Tramrail Division • The Cleveland Crane & Engineering Co. • 7519 EAST 290 STREET WICKLIFFE, OHIO

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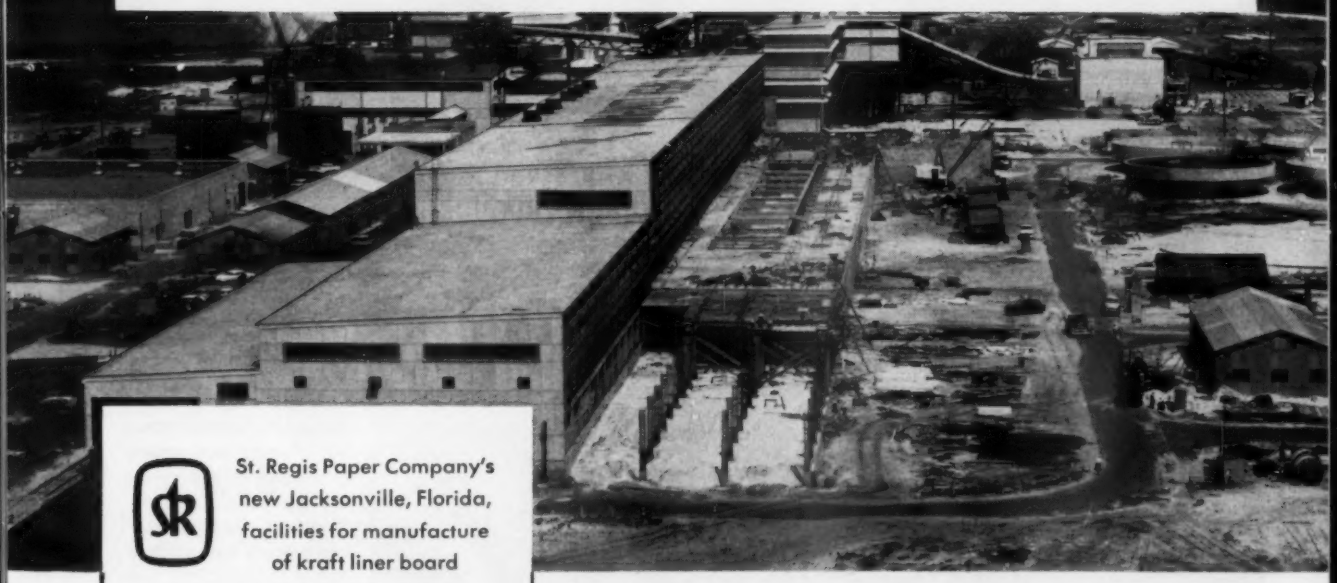
For more facts circle 604 on Reply Card ——→

Down in Jacksonville—where St. Regis is spending $40,000,000 to expand its facilities



St. Regis Paper Company's new Jacksonville, Florida, facilities for manufacture of kraft liner board

-we're building a paper mill of steel!

With a modern pulp and paper mill located near Jacksonville, Florida, completed in 1952, already producing 350 tons of kraft paper and paperboard daily, St. Regis Paper Company is currently investing $40,000,000 in additional facilities which will enable the Jacksonville mill to produce an additional 1,000 tons of kraft liner board per day.

This is a big project involving the use of 5,000 tons of structural steel for the many large buildings and other structures required for the modern mill. All of this steel was fabricated and nearly all of it was erected by American Bridge.

The vast new mill was designed by J. E. Sirrine Company, Engineers, of Greenville, S. C., and Stevenson and Rubens, Consulting Engineers of Seattle, Wash. Tidewater-Auchter was the general contractor for the project.

In constructing this new mill for St. Regis, American Bridge utilized its experience, knowledge and skill to the advantage of everyone concerned with the project. All steelwork was erected with maximum speed, precision, economy and safety.

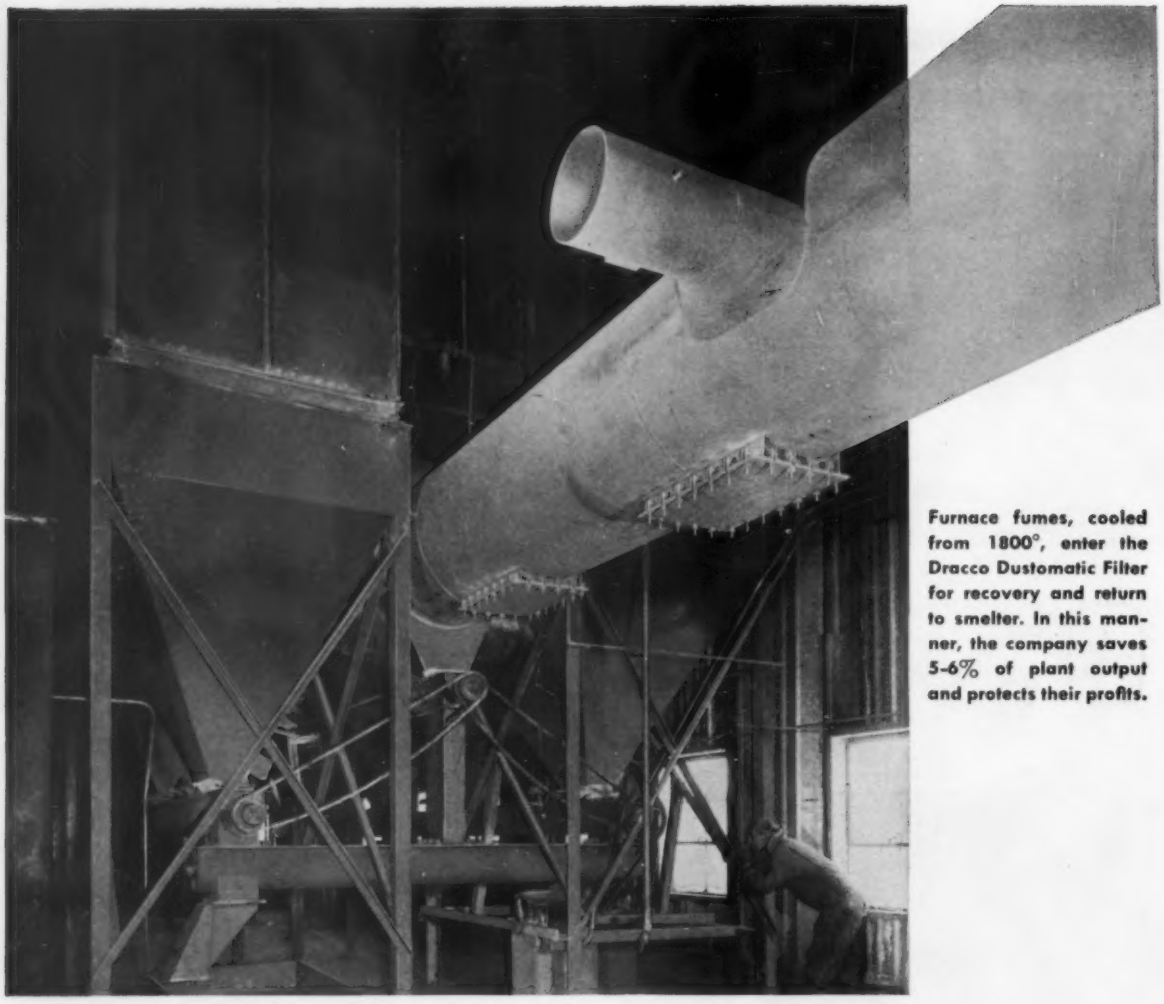
For detailed information regarding your structural steelwork requirements, please contact the office nearest you.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

Contracting Offices in: AMBRIDGE · ATLANTA · BALTIMORE · BIRMINGHAM · BOSTON · CHICAGO · CINCINNATI CLEVELAND · DALLAS · DENVER · DETROIT · ELMIRA · GARY · HOUSTON · LOS ANGELES · MEMPHIS MINNEAPOLIS · NEW YORK · ORANGE, TEXAS · PHILADELPHIA · PITTSBURGH · PORTLAND, ORE. · ROANOKE ST. LOUIS · SAN FRANCISCO · TRENTON · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

AMERICAN BRIDGE

UNITED STATES STEEL



Furnace fumes, cooled from 1800°, enter the Dracco Dustomatic Filter for recovery and return to smelter. In this manner, the company saves 5-6% of plant output and protects their profits.

Dracco Dust Control at lead smelter turns . . .

"hot" fumes to "cool" profits

Stack losses of hot lead oxide fumes can really eat into the profits of a lead-smelting firm. The problem is how to collect them efficiently and economically.

Dracco provided the answer for Aaron Ferer & Sons Co. by designing a U-tube gas cooler and heavy-duty Dustomatic Filter combination for their Omaha plant. Through efficient cooling and cloth filtration, the system collects *five to six percent* of the plant's output—a "cool" profit for the company.

The cooler takes fumes directly from blast and reverberatory furnaces and reduces their temperature from 1800° to 240°. All particles are then collected by the filter, automatically discharged for processing and returned to the furnace for smelting.

Uncontrolled plant dusts can cost you more than money. They destroy plant cleanliness and employee relations. Dracco techniques have been successfully solving these problems for thousands of companies over the last 40 years. If you're interested, write Dracco for more information.

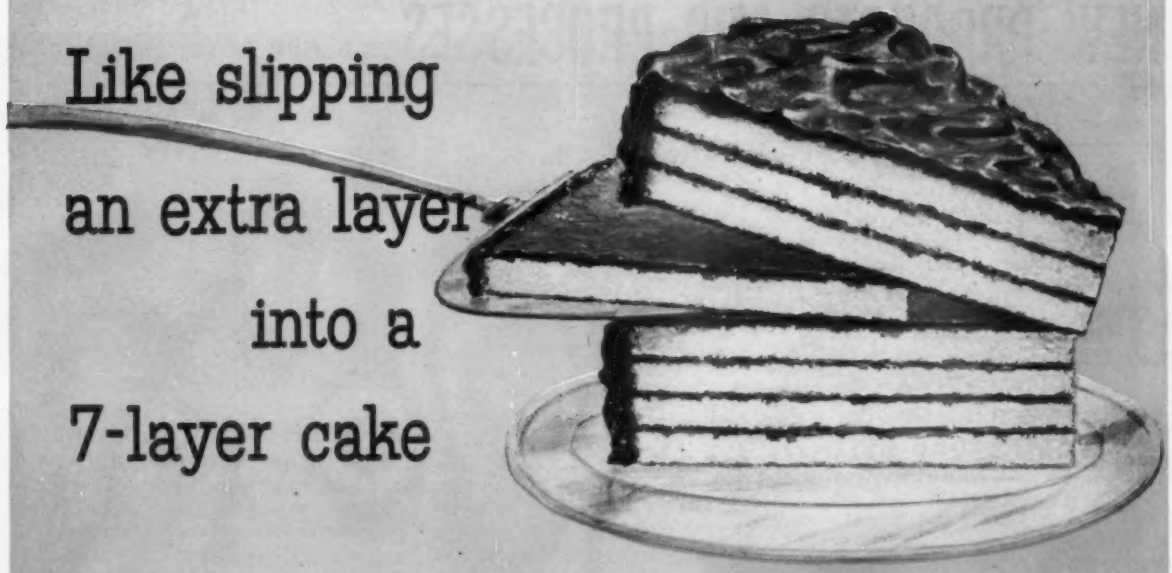
DRACCO CORPORATION
4035 East 116th Street · Cleveland 5, Ohio

Bulletin 800 is Dracco's 40-page catalog on dust control and recovery. Contains detailed facts and figures on all dust control equipment. For your copy, write Dracco today.

DRACCO *airstream* conveyors
dust control equipment

For more facts circle 605 on Reply Card

Like slipping an extra layer into a 7-layer cake



TIGHT QUARTERS

at Curtiss-Wright's South Bend plant (Utica Bend Division) created a rough installation problem. McGraw mechanical erection men had to fit in heavy-tonnage machinery for overhauling jet engines, but the ceiling was too low for conventional crane operation, and the plant had no overhead crane. To solve the problem, the McGraw team brought in a standard Tourna-Crane, reduced the boom height, and jockeyed the heavy, bulky equipment into place . . . like slipping an extra layer into the Sunday cake!

McGraw men, machines, methods and materials have established an outstanding record of meeting and conquering tough problems of industrial construction and mechanical erection for the major firms in American industry. A McGraw engineer would be happy to discuss your construction or installation problems with you – no obligation, of course.

F. H. McGRAW & COMPANY

ENGINEERS AND CONSTRUCTORS TO AMERICAN INDUSTRY

111 N. WABASH, CHICAGO, ILL.

HARTFORD • NEW YORK • PITTSBURGH • MONTREAL

For more facts circle 606 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

It's easy to obtain product data with the postage-free Reader Service Cards provided on pages 245-246. Use them for information on advertised products, too. Just circle the key number appearing at bottom of the ad.

1—STUD WELDING GUN is fast, light, easy to handle

Described as ⅓ lighter than previously marketed models, the NS-10 Stud Welding Gun is so balanced that it is as easy to handle as a hammer. Despite its small size, gun is said to

weld all studs up through ½-in. diam. The gun weighs less than 4 lb and measures only 9 in. The gun uses company's regular line of studs, ferrules, accessories. Nelson Stud Welding Div., Gregory Industries, Inc.

2—ALUMINUM CEMENT comes in self-metering tubes

Metalset A4 is an aluminum-filled epoxy resin compound, flexibilized for shock resistance, claimed to give superior repairs, joints, caulks and bonded surfaces. A resin-catalyst system, it comes packed in two collapsible tubes. The proper proportions of resin and low-toxocity catalyst are measured automatically by squeezing out identical lengths of each material from its respective tube. The two different colored components are then mixed to a uniform color. Additional amounts can be mixed if needed, or tubes stored for later use.

Metalset A4 can be used as a smoothing and caulking compound, a patching material for metals, wood, plastics, and concrete, and a repair cement for leaking tanks, pipes, conduit, and windows, as well as an adhesive material for bonding metals, wood, concrete and glass. It is described as water and oilproof, resistant to acids and alkalis, and non-flammable. It can be applied to vertical surfaces without sagging and does not lose this quality even after extended storage, company states. Following addition of catalyst, material hardens at room temperature, or for quick repairs with addition of slight heating. Finished repairs can be machined by conventional methods to a feather edge and are reported to withstand considerable mechanical shock. Metalset A4 is available in bulk, as well as in the 10½ oz tubes. Smooth-On Mfg. Co.

3—CONTROL for the high speed, machine tools

Ex-Po-Det, for high-speed automatic feed machine tools, is described as a current sensitive control which follows accurately the normal work load on the electric drive motor to which it is connected. While following changes in the normal load, it maintains high sensitivity to momentary increases in motor current, manufacturer states; the control is readily set to normal load and required sensitivity without further adjustment for changes due to warm-up, speed. Ex-Po-Det operates on any voltage a-c or d-c drive motor up to 1100 v and up to 20 amp per phase. Almy, Hayden & Maxwell, Inc.

4—LINK-TYPE BELTING is extremely flexible

Thoro-Link V-Belting is designed for use where conventional V-belt cannot be installed or replaced without causing machine down time. The belting is described as extremely flexible and able to operate efficiently over small sheave diameters. Each link is prestretched under controlled tension. The new belting comes in two constructions. Regular belting, red in color, is for use on the average installation requiring a standard FHP or multiple V-belt drive. The green belting is impregnated with a special Neoprene compound and is for oily or high temperature conditions. Dayton Rubber Co.

5—CONVEYOR SWITCH sorts packages automatically

For automatic sorting of packages according to size, weight or classification, this three-way switch offers compactness and simplicity of operation. It is announced as a ready means of dispatching packages into side aisles or straight through, without use of deflectors. The switch may be controlled by remote push buttons, limit switches, photoelectric cells and other electrical means. Limit switches classify by package heights. Scale controls divert underweight and overweight packages to right and left; those measuring correctly go straight ahead.

A series of classifications can be made through these switches to bring like packages into proper storage line, and automatic diversion to a by-pass line can be made in case the main line is blocked. The complete loading of one storage line can automatically switch to load a second and third line. The switches can also be used to feed tributary lines into a common main line. Standardized conveyor widths are 12, 15, 18 and 24 in.; turns are 45 or 90 deg. Switch is also made for manual control. The E. W. Buschman Co.

6—CHEMICALS simplify boiler and equipment cleaning

One of three new chemicals, Nalco 85, a boiler cleaning aid and supplementary treatment, is reported to remove a high percentage of deposit. Alkaline in nature, it may be applied to an operating boiler, manufacturer states. Nalco 85 is also said to cut cleaning time; clean headers and other areas inaccessible to manual cleaning; disperse calcium carbonate deposits; and require no neutralizing after cleaning.

For industrial process and heat exchange equipment, Nalclean 66 and 68 are described as powerful cleaning agents. They are blends of both organic and inorganic acids, and claimed highly effective in removing a variety of scale and deposits. In addition, says

Another Case of Cost-Saving with Crane Steel Valves

This valve has a 28-year service record

Here is another prime example of Crane valve dependability—and what it means in dollars and cents to the user.

This Crane cast steel wedge gate valve has seen more than 28 years of service. It is installed in a line from the steam header in the plant of Scott Paper Company's West Coast Division, Everett, Wash. The 8-inch, 300-pound valve is operated 2 or 3 times a week. After almost 3 decades of hard, continuous service on 450°F. steam at 250 psi., this rugged, precision-built Crane valve still closes tightly and easily. Yet it has required only routine maintenance.

From the outside, Crane valves may resemble others. The big difference is on the inside—where Crane quality in design and construction, in precision machining and superior castings, assures the low-cost, trouble-free operation you want. Call your Crane Representative for expert assistance in specifying and ordering.

You may spot cost-saving ideas in this book of "Valve Performance Facts"—32 case histories throughout industry. Ask your Crane Representative or write for a copy.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855 — Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

For more facts circle 607 on Reply Card

NEW PRODUCTS

(Begins on page 186)

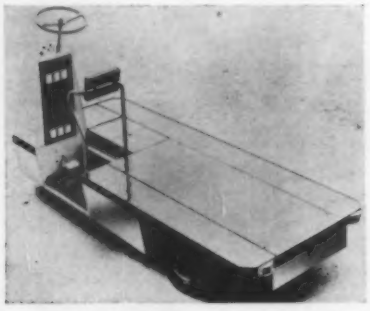
manufacturer, they contain corrosion inhibitors which protect metals commonly found in industrial equipment, and they minimize hazards to personnel. They are made in a dry, pulverized form and incorporate an indicator dye to give visual indication when solution strengths are depleted. National Aluminate Corp.

7—SOLENOID VALVES for general industrial use

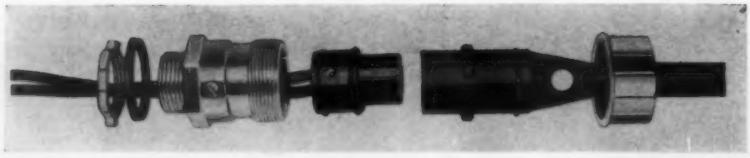
Series J Solenoid Valves are designed for flow control of water, air, light oils, brines, low pressure steam, industrial gas, LP gases and other non-corrosive fluids, with a maximum operating pressure differential of 150 psi. They can be mounted in any position, company says, have only two moving parts and utilize the principle of pilot port operation. Their synthetic diaphragms are said to be unusually durable, claimed to have successfully operated through millions of test cycles with little wear. Controls Div., Jackes-Evans Mfg. Co.

8—FLAT-TOP TRUCK works in narrow plant aisles

Called the One-Ton Lugger, this agile three-wheel flat-top industrial truck runs on batteries. It has a payload capacity of one ton and, company says, it can make a 90-deg turn at an aisle intersection as narrow as 7 ft. Its driver stands in a specially designed cockpit, leaving the deck clear for



cargo. When he is standing in driving position on the safety treadle, the truck is alive; when he steps off, brakes set and power is off automatically. Truck is equipped with a Dyna-Power direct drive motor and a built-in charger so that batteries may be recharged from any convenient 115-v a-c outlet. Batteries, motor and drive mechanism are all below the deck, with a hinged battery cover and lift-off deck for easy access. The dash wall also is easily removed for maintenance. Electri-Car Div., Victor Adding Machine Co.



9—ELECTRICAL CONNECTORS mount in "knock-out" holes

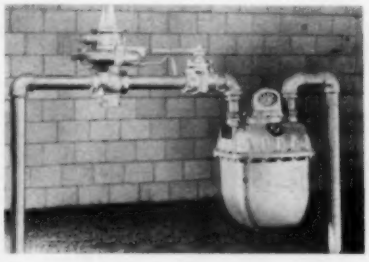
Called Change-outs because their use on control equipment greatly reduces time required to replace defective units with stand-by units, these electrical conectors are designed to mount directly through "knock-out" or threaded holes in wiring boxes, panels and ducts, or on small motors and electrically driven hand tools. They're available with two, three or four contacts for 8- through 20-amp applications at a 600 v maximum rating. Receptacles are made up of two parts —a threaded aluminum mounting shell and a molded, one-piece Neoprene insulated insert with pigtail wiring leads. Plugs are permanently molded to cable as one-piece insulated units. It is pointed out that when engaged, connectors are dust tight, corrosion resistant and moisture-proof. Bulletin B68 gives details. Joy Mfg. Co.

10—AIR DRIVEN PUMP handles the hot liquids

This air-driven, alloy pump is announced for fast, efficient handling of molten salt and other liquids up to 2000 F. While designed primarily for emptying salt bath furnaces during maintenance, it is suited to other high temperature applications. The pump is made of a limited number of heat-resisting alloy parts and driven by a self-cooling air motor. Using an air supply of 90 psi, the pump can handle 600 lb of molten salt a minute; with a 60 psi supply, 450 lb a minute. Pump volume can be reduced by adjusting the air intake valve. Ajax Electric Co.

11—COMPOUNDS clean and seal boilers, equipment

Clogged and leaky boilers are quickly reconditioned with two special compounds, it is announced, one removing accumulated dirt, rust, sludge and other foreign matter, the other sealing leaks without requiring heating system to be shut down. Heat-Pep Cleaner is designed to loosen core sand, oil and other dirt common to new boilers, and remove accumulation of rust and other impurities from old boilers. It contains ingredients which coat boiler walls and protect them against rust and corrosion. It is described as unique in that its action is physical rather than chemical. In addition, it vaporizes and gets through entire heating system, not just the boiler. The sealing compound mixes readily with water and is claimed to work its way directly to any leak and seal it almost immediately. Boiler pressure then causes compound to form permanent bond. Both cleaner and sealing compound come in either powder or liquid form; powder is recommended where climate might cause freezing. J.A. Sexauer Mfg. Co., Inc.



12—ALUMINUM METER for the low-pressure services

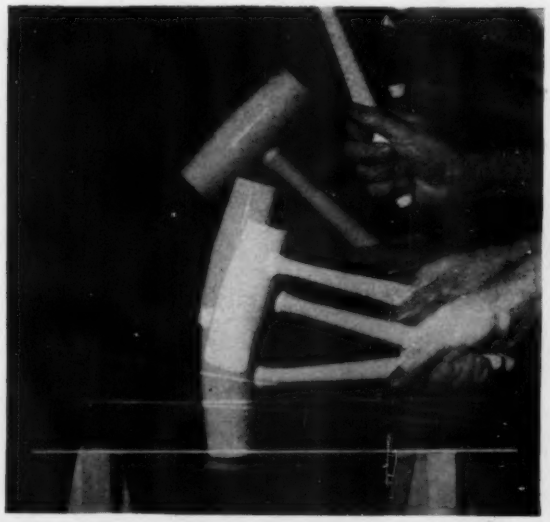
The Model 750 is a lightweight, single-joint aluminum gas meter designed primarily for services requiring large capacity at low working pressure. The meter weighs only 47 lb—about half the weight of many meters of its capacity—and can be carried and installed by one man. Its 15-psi working pressure and capacity of 750 cu ft per hour at ½ in. differential and 1600 cu ft per hour at 2 in. differential suggest its use for small industrial installations. The meter is available with either 45 light steel spud connection or 1½-in. pipe tap connection. Meter and Valve Div., Rockwell Mfg. Co.

13—FLUORESCENT LAMP is over twice as bright

The Super-Hi is announced as producing two and one-half times as much light as standard fluorescent lamps. According to manufacturer, development of this lamp was made possible by utilization of a mixture of rare gages to obtain long cathode life and maintain high brightness during the life of the lamp. The increased brightness is obtained in the same conventional sized tube (T12) as present day lamps. Cooling chambers at each end of the lamp and the use of continuous filament heating contribute to excellent starting and operating characteristics,

Plexiglas... useful in so many ways around the plant

Impact Resistance... just ONE of its advantages



Impact of mallet hitting a pane of PLEXIGLAS tends to flex it rather than break it. Note how PLEXIGLAS "gives" with the blow.

PLEXIGLAS® acrylic plastic solves many safety, maintenance, inspection and operating problems in industry. It combines great strength, light weight, crystal clear transparency, corrosion resistance, weather resistance, formability and machinability.

What's *your* specific need for PLEXIGLAS?—

- **WINDOW GLAZING**
- **PROTECTIVE COVERS**
- **SAFETY GUARDS**
- **ACID SHIELDS**
- **INSPECTION WINDOWS AND TANKS**

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For more facts circle 608 on Reply Card

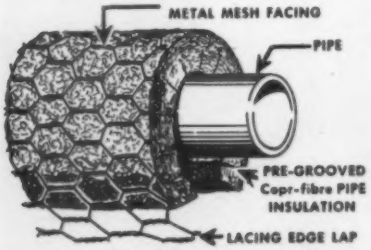
NEW PRODUCTS

(Begins on page 186)

company states. Available in 48-, 72- and 96-in. sizes, the lamps are rated at 6000, 9300, and 13,000 initial lumens. They will come in cool white, and have recessed double contact bases. Westinghouse Electric Corp.

14—PIPE COVERING offers one-piece application

Copr-fibre Lace-On Pipe Covering is announced as a felted mineral insulation which gives a one-piece application at minimum first in-place cost. It is reinforced with a metal mesh facing horizontally laced together around the pipe, and requiring no extra wire. The



insulation is pre-grooved on inside surface which allows an easy wrap and a tight fit around pipe. After application, the covering can be jacketed with aluminum or galvanized sheet metal for exterior application. Temperature range for which Lace-On is recommended is from 100 to 1200 F. Thicknesses available range from 1 to 5½ in. It is applicable on 2- to 14-in. and larger sizes of pipe. K factor is 0.26 at 100 F. Manufacturer says it is chemically neutral, moisture resistant, stable, incombustible, and it will not cause or accelerate corrosion. Forty-Eight Insulations, Inc.

15—PLASTIC FLASHING is highly water resistant

Saraloy 400 Elastic Flashing is a black, thermoplastic sheet of vinylidene chloride copolymer, said to be more effective against water penetration than other available materials. It requires no shop fabrication, says manufacturer, and is applicable on the job to almost any construction shape and material, including corrugated roofing and siding, vent stacks and masonry chimneys. The elasticity of the sheet serves to prevent breakage of joints or loss of bonding to the surface of the building as the latter expands and contracts with temperature changes.

Besides its use for usual roof drain, ventilator base, and cap and base flashing applications, Saraloy 400 is reported equally effective for expansion joints, fascia coverings and interior flashings. According to company, the sheet will form a seal around nails driven through it, is chemically resistant to fire, and has a paintable surface. Also claimed resistant to abrasion and tearing, the new flashing may be cut to size on the job with a knife or heavy-duty scissors and can be solvent bonded to itself to form permanent joints. The Dow Chemical Co.

16—BATTERY CHARGERS with modified features

Industrial type battery charges (Bulletin 203) are now available equipped with a number of modified features. A high-low toggle switch may be had for manual selection of charging rate. Also available in combination with the charger is a charging disconnect relay and reset timer. When the battery is low, the relay-timer-battery charger combination automatically charges the battery at a high rate for a fixed period. After this period, the battery charger is automatically reset to a trickle charge. Output voltages of 6, 12, 24, 32-v d-c have a charging rate of 0.05 to 2.0 amp (continuous adjustment). Automatic Switch Co.

17—DUST COLLECTOR for chip producing operations

Dustkop Model 5NB20, while designed for use in shop operations of the chip producing variety, is declared suited to any operation where dust volume is large, the need for air volume is comparatively low, and floor space is at a premium. The rollaway dust bin has a 9-cu ft capacity and seldom requires

emptying in the course of a normal day's work load, manufacturer states. The collector has a 1/3-hp motor and a cast aluminum fan capable of handling sizable metal fragments and wood chips without plugging. It is available outside vented, as shown, or as a recirculating collector using a cloth filter bag or conventional Fiberglas filter base. Aget Mfg. Co.

Use the Reader Service Cards provided on pages 245-246 to ask for more information on these products. Circle item numbers of products in which you are interested.

18—PREFAB SKYLIGHT works according to sunshine

Toplite is announced as a prefabricated skylight which selects only the most desirable rays of sunlight the year 'round. Its function is based on use of solar-selecting prisms which "open" and "close" to admit only cool, even light while rejecting the sun's hot rays, company explains. Advantages cited are maximum uniform illumination, reduction of artificial lighting costs, elimination of glare and reduction of solar heat transmission in summer.

Toplite functions according to the sun's position in the sky. Installed in relation to the north-south axis of a building, the prisms of the glass units remain "open" on their north side to transmit daylight in all seasons. However, manufacturer states, the south side of the same prisms "open" and "close" according to the season, the time of day and the sun's sky position. When the sun is high in the sky, its rays are bounced back off the Toplite prisms as though striking a mirror. Toplite panels come in five sizes from 2-by-2 to 6-by-3 ft. Two types are available—one flanged for installation directly on the roof deck, the other for installation on prepared masonry, wood or metal curbs. Kimble Glass Co.

19—CHECK VALVE for gas, air reciprocating compressors

The Silent Gas-Air Check Valve is a vacuum-controlled valve for gas and air reciprocating compressors not equipped with automatic unloaders. Designed for use in systems including reciprocating compressors with on-and-off operation, the check valve controls surge and "hammer" occurring when compressor is in operation. When the compressor cuts in, the valve disk to which the piston is attached rises. As it does, air is expelled from the cylinder, holding valve disk in open position while compressor is operating.

When compressor shuts down, weight of the disk forces its return to the closed position. There is only one opening and one closure while the compressor is in operation. Valve operates silently, company says, except when discharge valves of the compressor are leaking badly. In this case it acts as an alarm and pulsates with each stroke of the compressor. Valve comes in sizes from 1½ to 10 in. for

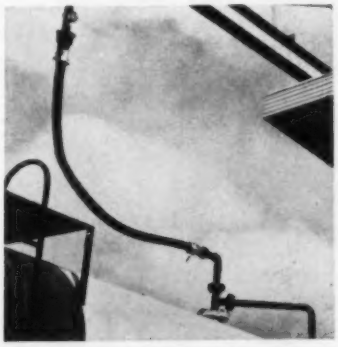
News about HYPALON®

HYPALON hose delivers sulfuric acid for over 4 years... still in good condition

Acid hose lined with HYPALON has given over four years of trouble-free service in unloading 66° Be. sulfuric acid at a battery manufacturing plant. The hose is used three times a month to transfer the acid from tank trucks to rooftop storage tanks.

HYPALON hose is used for its outstanding resistance to strongly oxidizing chemicals and acids. This flexible hose eliminates time-consuming "spotting" of the tank trucks formerly required when rigid piping connections were used.

HYPALON synthetic rubber has many excellent properties which can help reduce your maintenance and replacement costs. Just fill out the coupon for more details.



This HYPALON-lined hose is used to fill storage tanks with concentrated sulfuric acid. Photograph taken at the Reading, Pennsylvania, plant of the Reading Batteries Division of Electric Auto-Lite Company.

HYPALON *is a registered trademark of E. I. du Pont de Nemours & Co. (Inc.)*

Bulk containers save shipper ⅓ cent per pound

Big neoprene bins replaced paper bags and cut labor costs to the bone. Internal lifting cables are connected to carrying ring in top. Tight closures keep contents clean and dry.

Neoprene bins withstand wear, tear and weather

A plastics manufacturer had been using paper bags to ship granular resin—about 250,000 pounds per month—from one of his plants to another. Now he ships in bulk in these 300-cu.-ft. containers and saves ⅓¢ per pound, mostly in reduced labor costs.

For example, seven containers can be unloaded from a gondola by lift truck and moved to their outdoor storage point in about half an hour. It took 16 man-hours to unload the same amount of resin in 1300 paper bags.

The bins are collapsed for return shipment and used over and over. Their heavy multi-ply wall construction is built for years of hard service. The outer ply is neoprene to take wear and tear and stand off the elements. A fabric carcass provides strength, and an inner ply protects the fabric from the contents. The inner ply is also neoprene in applications requiring better-than-average resistance to oils and chemicals.

For more information about the use of neoprene in bulk shipping containers — or its use in hose, gaskets, belting or protective coatings—just clip the coupon below.

ELASTOMERS IN ACTION HYPALON® • NEOPRENE

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Better Things for Better Living
. . . through Chemistry

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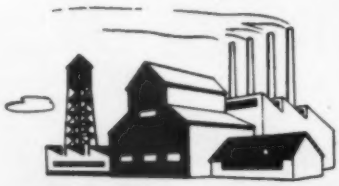
want quality slings?

The slings you use have to be the best. There's too much at stake—the safety of your crew, your equipment and the material they're handling. How can you make sure that the slings you have are the best available? Ask your supplier these questions:

Does the maker produce his own steel?



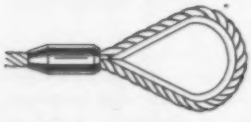
Then does he carefully test the results?

Does he process this superior steel into top-quality wire?

Then does he carefully test the results?

Does he make this superior wire into top-quality wire rope?

Then does he carefully test the results?



Does he fabricate this superior wire rope into top-quality slings?

Then does he carefully test the results?

If you receive even a single "no", it'll pay you to get the Wickwire story . . . to see how Wickwire Wire Rope Slings are made—from blast furnace to testing of the completed sling—by a *single* company with over a century and a quarter of wire-making experience. Contact the nearest sales office below today.

CF&I **WICKWIRE**
WIRE ROPE SLINGS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION 4236

THE COLORADO FUEL AND IRON CORPORATION—Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City Tulsa • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) New Orleans • New York • Philadelphia • CF&I OFFICES IN CANADA: Toronto • Montreal

For more facts circle 610 on Reply Card

NEW PRODUCTS

(Begins on page 186)

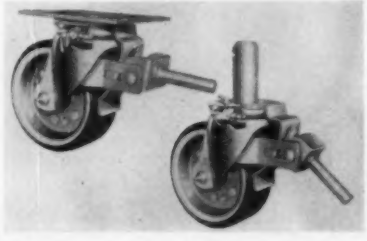
pressures from 125 to 2500 lb. It is for installation in vertical position only. Williams Gauge Co., Inc.

20—DRILLING MACHINES offer design improvements

According to manufacturer, the improved No. 15 Drilling Machines incorporate a drilling head which achieves maximum ease of operation with minimum operator fatigue. Improvements announced include front-mounted, start-stop pushbutton switch, easily-seen speed range table, depth gauge graduated for easy setting, and three-grip spindle feed. The belt guard tilts upward to simplify speed changes and the motor bracket is hinged so that the belt may be changed from one step to another on the pulleys, without having to adjust the motor bracket. The complete line of drills includes bench, floor and pedestal models. Bench and pedestal types come in one- to six-spindle models. Bulletin 4024 gives details. Buffalo Forge Co.

21—SCAFFOLD CASTERS make overhead jobs safer

With Series C900 Swivel Stem and CP900 Swivel Plate Casters, featuring double acting locks, mobile equipment



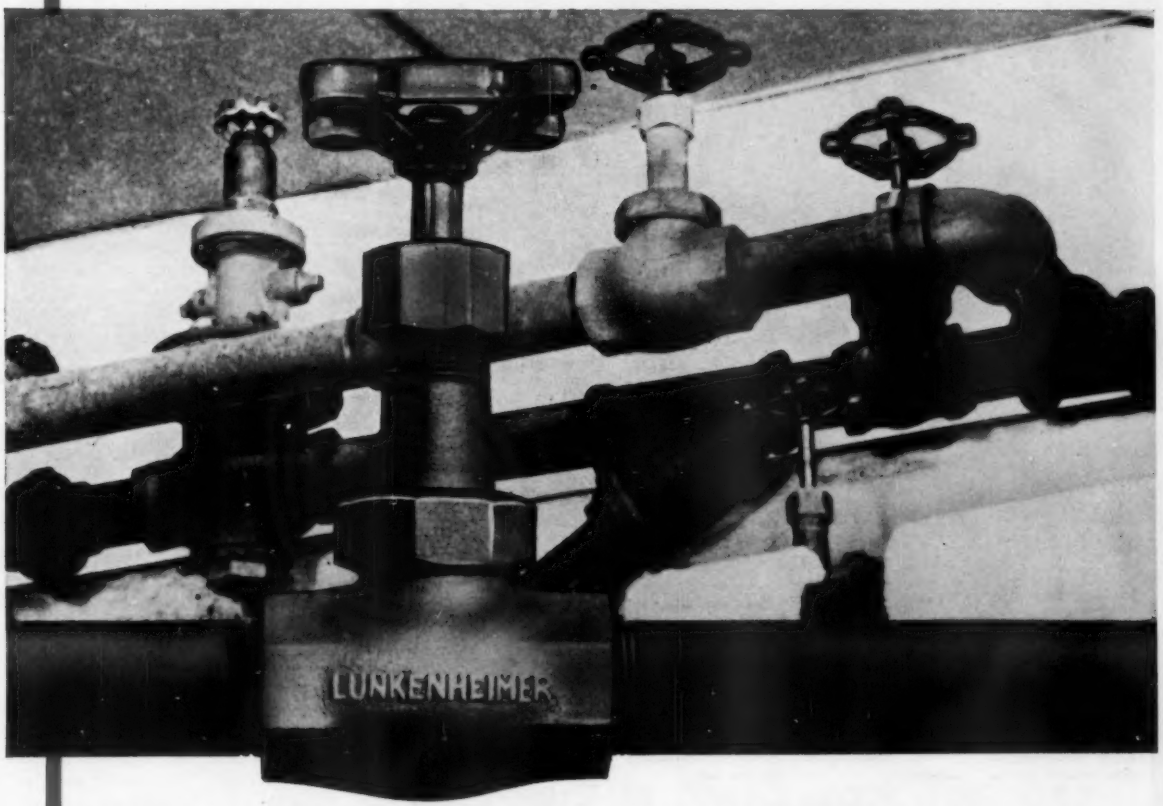
holding workmen can be locked against movement in any direction, until levers are released, manufacturer states. The casters combine double ball bearing swivel and simultaneous locking of both swivel and wheel action. Faultless Caster Corp.

22—CHEMICAL FEEDER has a self-cleaning mechanism

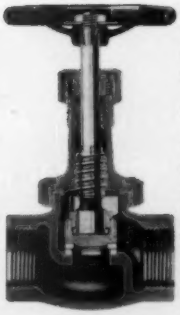
The A- 690 Dry Chemical Feeder with a self-cleaning feeding mechanism will feed up to a rate of 2.85 cu ft per hr. The self-cleaning feed screw discharges chemical alternately from each end of a feed tube. While one end of the screw is discharging the chemical, the other end is cleaned by being threaded through the material. This feeding mechanism is also designed to prevent chemical flooding. The feed

Don't let LOW-QUALITY drain away YOUR *Maintenance* DOLLARS

The cost of a LUNKENHEIMER VALVE *Gets smaller... and smaller... and smaller...* with each passing year of dependable service.



The price you pay for the average valve represents only a fraction of its total cost. Every time a valve requires repair, more and more of your precious maintenance dollars are drained away. With today's high labor costs, it takes only one or two repair jobs to spiral maintenance expense up to a point many times higher than the original price of the valve. That's why it always pays to install the best valves your money can buy. When you insist on the extra margin of good workmanship and quality materials that go into Lunkenheimer Valves, you get your investment back many times over in trouble-free, maintenance-free service. The Lunkenheimer Company, Cincinnati 14, Ohio.



There's a cost-minded Lunkenheimer Distributor in your area. Let him show you how Lunkenheimer quality can contribute to valve maintenance savings in your plant. And be sure to check the amazing performance records of LQ600, with patented Brinalloy® seats and discs.

L-357-18

- BRONZE
- IRON
- STEEL
- PVC

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

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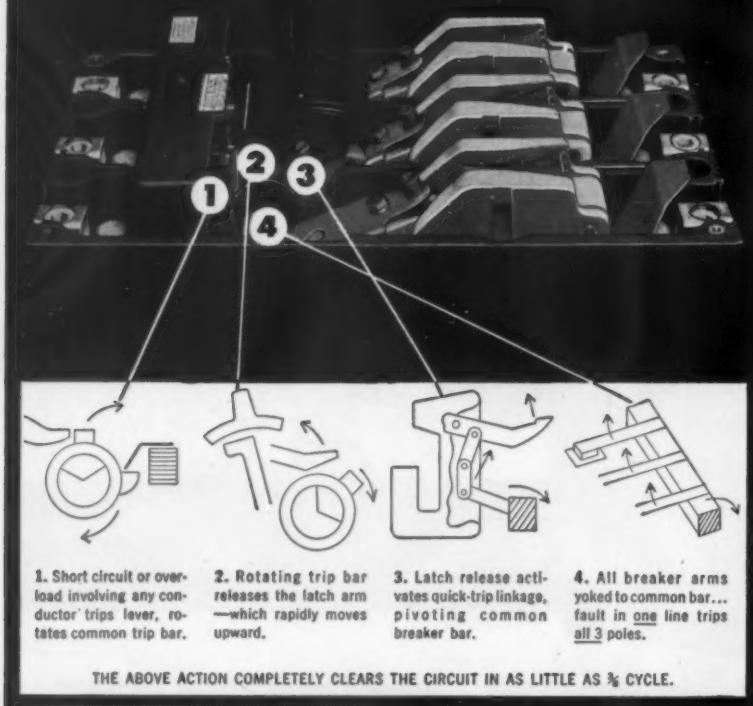
only
circuit breakers prevent
fault single-phasing



1. Short circuit or overload involving any conductor trips lever, rotates common trip bar.

2. Rotating trip bar releases the latch arm —which rapidly moves upward.

3. Latch release activates quick-trip linkage, pivoting common breaker bar.

4. All breaker arms yoked to common bar... fault in one line trips all 3 poles.

THE ABOVE ACTION COMPLETELY CLEARS THE CIRCUIT IN AS LITTLE AS ⅜ CYCLE.

Westinghouse AB breakers
trip ALL THREE poles
on any circuit fault

YOU CAN BE SURE...IF IT'S
Westinghouse

WESTINGHOUSE ELECTRIC CORP. BOX 868 PITTSBURGH 30, PA.

J-30260-A

For more facts circle 612 on Reply Card

NEW PRODUCTS

(Begins on page 186)

rate is adjustable over a wide range by a knob connected to a feed register. The feeder has a hopper capacity of 3¼- cu ft. Arching in the hopper is prevented by the action of oscillating diaphragm-type agitators. The feeder is constructed of heavy gage steel with a corrosion resistant finish. Two solution chambers are available—a twin jet agitated swirl type chamber and a 25-gal tank equipped with a triple jet mixer or mechanical mixer. Wallace & Tiernan Inc.

23—ROLLER UNITS give mobility to storage racks

Rol-Rak Systems save floor space by mounting cabinets, storage shelves, tool cabinets or lockers, on ball-bearing wheels that roll on steel tracks. This mobilizing of storage facilities eliminates need for aisles between rows of cabinets. One storage unit is

omitted from each row to permit access to units behind. The tracks rise ½ in. above floor and are placed in parallel rows. By rolling the cabinets along the tracks to either side, you can gain access to any one of the units, it is pointed out, and even when loaded to capacity, they roll along easily. The back row of cabinets, from which no units are omitted, are stationary. The steel wheeled-base units adjust to fit cabinet or rack units from 24 to 48 in. wide, 9 to 42 in. deep. Load capacity of each standard unit is 1½ tons. Base unit and track of a single Rol-Rak costs around $35. Mobile Racks, Inc.

24—OIL SEPARATOR removes oil from gas streams

Designed for use in plant streams and in spot checking, the Model A Oil Separator is claimed to remove oil from gas streams down to microscopic quantities. Manufacturer explains that by draining the oil immediately out of the path of the entering gas stream, it prevents pickup and buildup of the oil

MASONITE

TEMPERED PRESDWOOD

...no snags or splinters in these work surfaces

It's smooth going—from the receiving room, all through the plant, and out to the shipping dock.

The surface of sturdy Masonite® Tempered Presdwood® stays smooth. No splinters or slivers to annoy workers. Presdwood is free of knots and grain . . . won't split or splinter.

These panels can really take punishment. They resist bumping and pounding, denting and scraping. They're easily sawed and fitted, and they last indefinitely.

Your lumber dealer carries Tempered Presdwood, Tempered Duolux® (smooth on both sides) and a variety of other Masonite panels for smoothing out production kinks.

Many more cost-cutting uses for Masonite panels:

- Pallets and trays
- Mats and runners
- Bins and cabinets
- Partitions
- Signs
- Safety guards

MASONITE® PRODUCTS

®Masonite Corporation—manufacturer of quality panel products

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Please send me your free booklet on factory methods and Masonite panels.

Name .....
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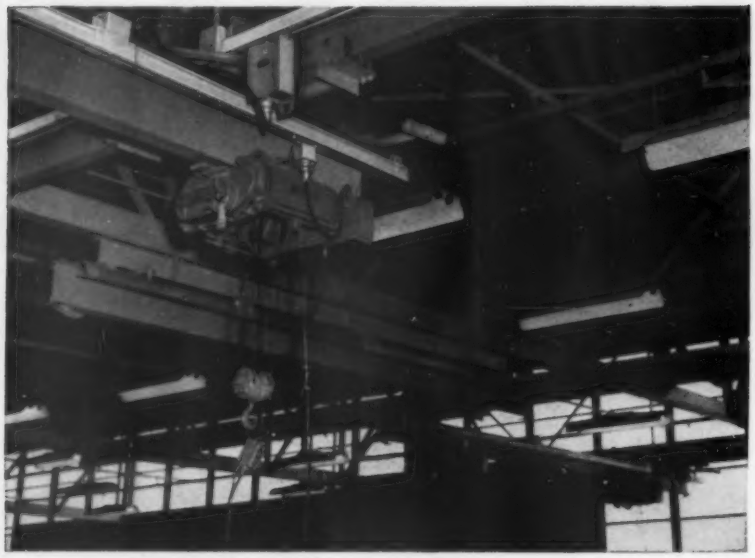
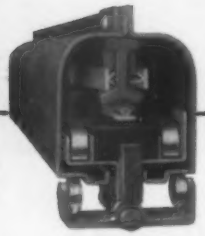
For more facts circle 613 on Reply Card

4 EQUALLY GOOD REASONS



...why your cranes and hoists should be FEEDRAIL® powered



Throughout industry, flexible Feedrail systems, in capacities from 60 to 500 amperes, provide convenient movable power sources for:

- Cranes and Hoists
- Production Lines
- Conveyor Assembly Lines
- Moving Test Lines
- Portable Tools
- Machine Tools
- Cutting and Sewing Rooms
- Lighting
- Motor Control

1. Safe electrification. Feedrail conductors are protectively enclosed in steel – no exposed wiring, no trailing cables. You enjoy maximum protection for personnel and equipment.

2. Minimum maintenance. Elimination of frayed, sagging, broken wires means safer, less frequent maintenance.

3. Better materials handling. There are no time consuming traffic holdups with Feedrail. Fewer accidents, less maintenance mean absolutely minimum down time – more efficient materials handling.

4. Lower operating costs. Elimination of hazardous, wasteful working conditions not only leads to better performance but improves safety records and plant morale as well – eventually lowers insurance costs too.

A Feedrail "moving power system" will fit your crane or hoist's needs – can be installed quickly and easily. Get full information. Write today to Dept. P11.

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Subsidiary of Russell & Stoll Company, Inc.

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SPECIALLY QUALIFIED REPRESENTATIVES IN PRINCIPAL CITIES

For more facts circle 614 on Reply Card

NEW PRODUCTS

(Begins on page 186)

by the gas. The oil is drained down a wick to a reservoir located in the bottom of the separator. The large effective path of the gas passing through the unit as compared to the size of the unit itself, combined with the maintenance of intimate contact of gas condensing surfaces throughout the path, makes the unit exceedingly efficient, company says. Applications suggested include those in chemical or refrigerant gas streams containing oil, and in air or nitrogen purge gas streams. Manufacturers Engineering & Equipment Corp.

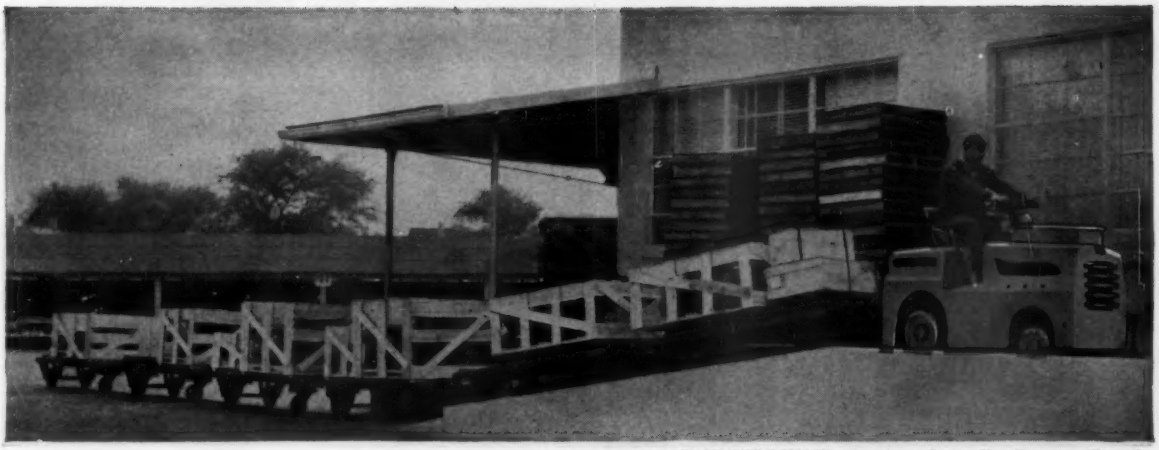
25—WIRING RACEWAY of self-extinguishing material

Improved Panel Chanel is made of a tough reinforced phenolic claimed not to support combustion. If subjected to direct flame, it is immediately self-

extinguishing without after-glow when the flame is removed, according to company. The new material used in this raceway is said to offer an improvement in fire-retardant properties without sacrifice of other important qualities of the phenolic-base composition. It is lightweight, durable, and does not warp or sag even under high temperatures normally encountered in panelboards. Bulletin S-302 gives details. Stahlin Brothers, Inc.

26—INFRARED SYSTEM protects against intrusion

This long range photoelectric control system uses invisible modulated infrared light to protect large areas against intrusion. Long range operation from an invisible infrared beam is made possible by the use, as the photoelectric receiver, of Firetron, a lead sulfide photoconductor. The system consists of a modulated infrared source, a photoelectric receiver, and a control unit. The high sensitivity of the sys-



DYNAMOTIVE Tractor above "walks away" with 19,225 lb. load up 12% grade at Robbins & Myers plant.

NOW...A GAS TRUCK THAT DOES MORE WORK ON 25% TO 30% LESS GAS...

Automatic DYNAMOTIVE

The secret of Automatic DYNAMOTIVE'S (GLF Series) proved superior performance lies in its utter simplicity...an engine-driven variable voltage generator supplies electrical power to the drive motor direct coupled to the drive axle. This proved power train *without gears* eliminates slippage and power loss through heat build up. Additional gas mileage is achieved by the inherent overdrive and torque multiplying features of the electric power train.

Among many other advantages are the following:

Positive Inching Control...precise spotting gives faster, safer handling of loads.

Job Adjustable...directional control can be adjusted... on the job...for instant power or cushion-smooth takeoff.

Tilt and Lift Controls...optional for either foot or finger-tip operation.

Full Width Posture Seat...accessible from either side ...reduces driver fatigue.

Visibility...high visibility of fork position throughout lifting range.

Safety...Dynamotives are listed by Underwriters' Laboratories Inc., and Factory Mutual Laboratories.

G.L.F. Capacities: 4,000 to 10,000 lbs. with solid tires... 4,000 and 6,000 lbs. with pneumatics. Tractors available in 2,500 and 3,500 lbs. draw bar pull.

But see for yourself. *Ask for demonstration* and/or complete specifications with case histories of installations similar to your own. No obligation...write today.

Part of a **DYNAMOTIVE** "fleet" used for warehousing, loading, etc. Calumet Industrial District Co.

This **DYNAMOTIVE** unit paid for itself in one year says Lock Joint Pipe Company official.

Factory service available in over 100 cities.

AUTOMATIC TRANSPORTATION COMPANY

Dept. W-7, 105 West 87th Street, Chicago 20, Illinois
Division of the Yale & Towne Manufacturing Company

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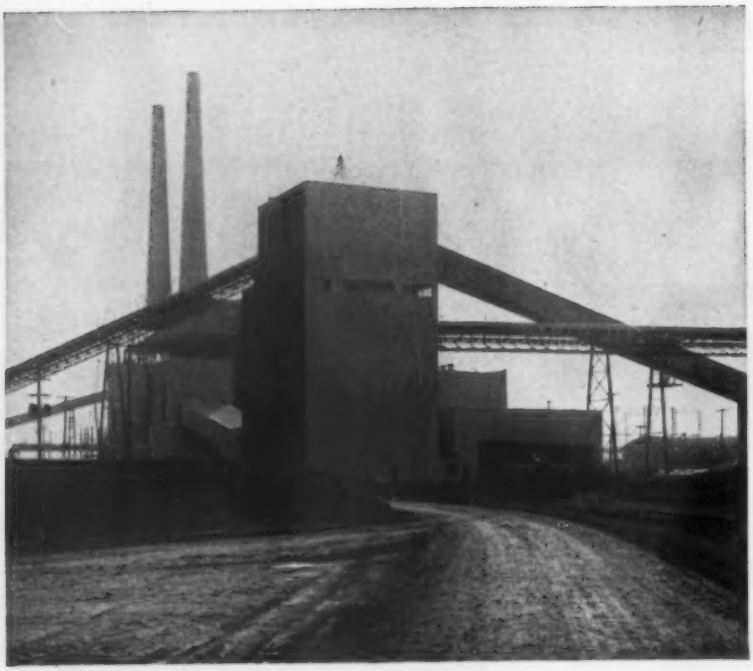


Moves a million-ton mountain of coal a year!

One of the largest in the U. S., this system depends on over 7,000 feet of Quaker Rubber belting to keep the coal moving.

PROBLEM: The Detroit Edison Company needed three separate conveyor systems to carry coal into their River Rouge power plant: (1) dock to storage, (2) dock to breakers to plant, (3) storage to breakers to plant.

SOLUTION: Quaker engineers and the Quaker distributor's men, working with engineers of the power plant, suggested the use of a belting designed for high lifts and long center distances. Over 7,000 feet was installed.

RESULT: The three conveyor systems work smoothly and efficiently, carrying coal into the plant at the rate of one million tons a year.

YOUR PROBLEM: Whatever your conveyor needs, whatever your industry—there's a Quaker Rubber Belt (or Hose) of the *right* construction to handle the job safely and economically. Quaker engineering service is available for the asking.

To make sure 7,000 feet of Quaker Rubber conveyor belting (available in 48", 60" and 72" widths) was properly installed, splicing and vulcanizing of the belting was supervised by a Quaker Rubber specialist.

For your free brochure on conveyor belting, write your nearby Quaker Rubber distributor, or:

H. K. Porter Company, Inc.,
Quaker Rubber Works,
Philadelphia 24, Pa., or
Pioneer Works, Pittsburg, Calif.

H. K. PORTER COMPANY, INC.

QUAKER RUBBER DIVISION

For more facts circle 616 on Reply Card

NEW PRODUCTS

(Begins on page 186)

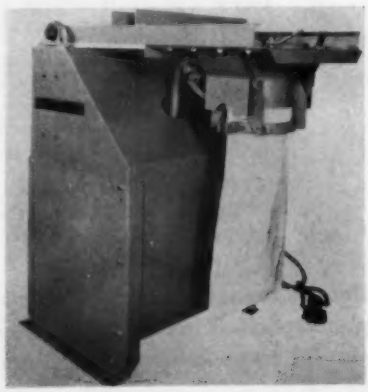
tem permits extensive coverage—up to 1000 ft—using a single system. By combining systems, critical plant areas can be surrounded or crisscrossed with unseen "curtains" of invisible light. As an intruder enters the protected area the control sounds an alarm or flashes a warning to protection personnel. The system may be installed indoors or out. It responds to its own infrared source and will signal a beam interruption as short as 0.005 sec. Bulletin PA 579 gives details. Photoswitch Div., Electronics Corp. of America.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 245-246.

27—BAG PACKER works faster and with less labor

The G-73 Impacker is reported to reduce labor and handling time while speeding up operations—to twelve 100-lb bags a minute. It is for packing burlap, cotton and jute bags, and it has a vertical jouncing action which impacts material into the bag while the latter is clamped in place. The unit operates without noise or vibration to provide smaller, more compact packages, according to company. Materials which can be handled by the bouncing packer include meals, mashes, hulls, beet pulps, molasses feeds.

You attach bags to an air-operated, foot-controlled bag holder while packer is stopped. Upon release of a foot pedal, bag clamps lock the bag to the spout and the packer starts. After material is tightly packed, you press the pedal to drop the bag onto a conveyor or sewing belt. Manufac-



Chemically inert fittings, too

Made with standard 125# and 150# ASA housings (short radius), these 45° and 90° elbows can be installed in all standard flange piping systems.

Fluoroflex-T lining extends over the full gasket face of flange thus providing chemically inert, one-piece continuous barrier against all corrosive fluids.

Fluoroflex-T type S pipe and fittings are available in 1″, 1½″, 2″, 3″, 4″ and 6″ sizes.

FLUOROFLEX-T IS TEFLON AT ITS BEST

It's a known fact that properties of Teflon can be changed manyfold by deliberate or accidental minor variations of processing methods. The fabricator's *experience*, therefore, is the user's best assurance of quality and performance.

VISIT OUR BOOTH 889-891 AT N. Y. CHEMICAL SHOW.

universally corrosion-PROOF piping . . . with strength of steel

Here is a chemically inert piping system that now means substantial savings for plants where severe corrosion is a costly downtime problem . . . and thermal shock an ever-present hazard.

NO CORROSION — EVEN AT HIGH TEMPERATURE AND PRESSURE

Lined with a patented high density compound of Teflon®, Fluoroflex®-T type S Pipe can handle virtually every known corrosive substance to 500°F. It will not contaminate the fluids handled.

The Fluoroflex-T liner is formed *over the full gasket face of the flange*, eliminating troublesome joints with built-in protection and sealing that requires no extra gasket. It is housed within schedule 40 seamless steel pipe with 150# ASA flanges. 300# ASA flanges also available.

ACTUAL SERVICE REPORTS: Replacing glass lined steel pipe for handling 20% hydrochloric acid at 248°F and 20 psi, pipe lined with Teflon resin was still in use 34 months later.

Lined pipe replaced silver lined pipe for handling acidic stream of boron trifluoride hydrochloric acid and organic acid at 347°F, 18 psi . . . was unchanged after 5 months.

Write for data and nearest distributor.

Fluoroflex-T completely covers full gasket face of flange . . . making integral gasket and liner absolutely immune to:

- **All acids including hydrofluoric, hydrochloric, sulphuric, aqua regia**
- **all caustics**
- **all chlorides inorganic and organic**
- **all sulphates**
- **all solvents**
- **all phenols**
- **all bleaching solutions**
- **all peroxides**

all hot . . . and at all concentrations

® *Fluoroflex is a Resistoflex trademark, reg., U.S. off.* ® *Teflon is a DuPont trademark.*

Originators of high temperature fluorocarbon hose assemblies

Resistoflex
CORPORATION

Roseland, New Jersey • Western Plant: Burbank, Calif. • Southwestern Plant: Dallas, Tex.

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ONLY TWO MOVING PARTS IN THE LIQUID

Now you can achieve fine-instrument accuracy in the processing of corrosive liquids . . . in batching, blending, transfer, cost accounting, etc. . . . with this new Neptune Stainless Steel Meter.

Also important in many processes, this Neptune meter ends many problems caused by contamination of liquids being measured.

Based on the reliable Neptune positive displacement principal, its accuracy is completely protected from the effects of corrosion or corrosive wear. There are only two moving elements in contact with the liquid. The gear-train is mounted outside the casing, isolated from the liquid.

Available with Direct Reading, Print-O-Meter or Auto-Switch Registers. Size 1½", capacity 100 gpm. with most liquids.

Ask for Bulletin 94/10 PE

NEPTUNE METER COMPANY
19 West 50th Street, New York 20, N. Y.
BRANCHES IN: ATLANTA • BOSTON • CHICAGO • DALLAS DENVER • NEW YORK • NO. KANSAS CITY, MO. • LOS ANGELES • LOUISVILLE • PORTLAND, ORE. • SAN FRANCISCO-BAY AREA (MILLBRAE)
IN CANADA: NEPTUNE METERS LTD., TORONTO 14, ONT.

neptune

For more facts circle 618 on Reply Card

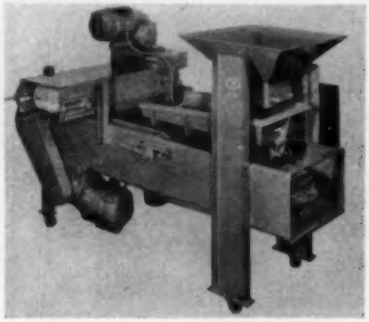
NEW PRODUCTS

(Begins on page 186)

turer says the scale cannot discharge with the bag holder open. Standard bag holders have quick-change clamps so that various sized round or almond-shaped spouts may be applied. Richardson Scale Co.

28—SEPARATOR, magnetic, is all-purpose unit

Self-contained and portable, the Type TBS Magnetic Separator is primarily for tumbling barrel applications but is also reported efficient as a concentrator and separator for other products, including scrap. It consists of a hopper with an adjustable gate, vibrating feeder and self-cleaning permanent



Alnico plate magnet, all mounted on a portable conveyor. In operation, a controlled, even layer of material is fed to the conveyor, and as it passes under the magnet, iron is lifted out of the burden. Magnetic attraction holds iron on the underside of the moving cross-belt until it is discharged off to one side. Operation is automatic. It is pointed out that with this separator, a highly concentrated magnetic product can be obtained from a feed containing a low or high percentage of iron. Quality of separation and product purity are claimed high because the feed rate can be controlled and magnetic intensity adjusted. Bulletin 1215-A provides data. Dings Magnetic Separator Co.

29—MONITORING UNIT detects abnormal vibration

Introduced for the protection of rotating equipment operating with more than normal vibration, the Model 65-LS is a low sensitivity malfunction detector with a range 0-4.5 G's. According to manufacturer, this monitoring device is cased in an explosion-proof housing suitable for Class I, Group D; Class II, Groups F and G hazardous applications. It is available with single pole, double throw switch,

THREADS ARE MACHINED BEFORE GALVANIZING

for end-to-end protection against corrosion

XDUCT RIGID STEEL CONDUIT listed by UNDERWRITERS' LABORATORIES, INC.

National Electric Products

PITTSBURGH, PA.

2 Plants • 12 Warehouses • 41 Sales Offices

For more facts circle 619 on Reply Card

REMINDER!

Have you changed your electrical system over to winter?

Let's reduce motor burnouts this year. Remember to change your motor protectors back to winter ratings.

During the hot summer months, many maintenance departments are forced to up-rate the elements in motor protectors to prevent nuisance stoppages due to high temperatures. When winter comes, they neglect to change back to normal ratings. That's when many motor burnouts occur.

ELIMINATE THE WHOLE PROBLEM

You can lick the whole problem, and eliminate motor burnouts too . . . just by using Heinemann Motor Controllers. The rating of Heinemann Motor Controllers is unaffected by heat or cold. No unnecessary stoppages in summer; no change-overs for winter.

The difference is that Heinemann Motor Controllers operate on power, not heat. Instead of thermal elements, they employ a hydraulic-magnetic principle that you should know about.

Send for a copy of Manual 101, *"What you should know about Circuit Breakers"* and Bulletin 1410 on Heinemann Motor Controllers. HEINEMANN ELECTRIC CO., 128 Plum St., Trenton 2, N. J.

HEINEMANN Motor Controllers

For more facts circle 620 on Reply Card

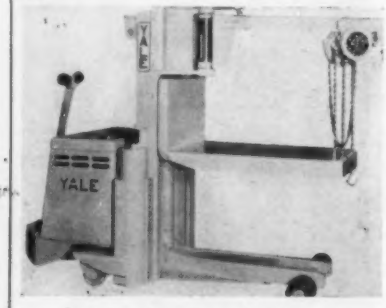
NEW PRODUCTS

(Begins on page 186)

and a split contact normally open switch, both rated 7 amp. Adjusting the sensitivity of the device and resetting are done without opening the housing, it is noted, and a tamper-proof guard is provided for the control. Applications include many types of engines, gear boxes, impact mills, centrifuges and other rotating and reciprocating equipment with vibration levels above the range of the malfunction detector. Instrument Div., Robertshaw-Fulton Controls Co.

30—LIFT TRUCK has boom for use with conveyors

This rider-walkie lift truck has an attachment which serves to integrate the unit with conveyor lines carrying bulky, fragile materials such as flasks of sand in a foundry. The unit is company's high lift platform Worksaver equipped with a swinging boom

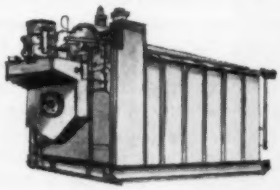


to which a ½-ton capacity spur gear trolley type hoist has been attached. The boom, 4-in. I-beam construction, slews through 180 deg permitting positioning of hoist over a conveyor line on either side of truck in order to transfer material from the line to the lift truck's platform, or from truck to line. Because of the 90-deg angle side loading the capacity of the boom is restricted to 750 lb. The 40-in. outreach boom permits 21 in. of hoist hook travel back and forth along the boom. The boom can be locked in the straight forward position during travel or when truck is used as platform carrier. The Yale & Towne Mfg. Co.

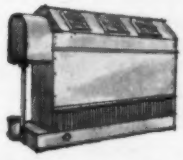
31—TWO-WAY RADIO serves the industrial vehicles

Advances incorporated in this compact, transistorized, multi-voltage, low drain radiophone are expected to expand the use of two-way radio in industry. The Dispatcher Radiophone occupies only 1/5 cu ft due to extensive use of transistors and plated circuitry. The transistorization is also

Now. **new acid cleaners**



Steam Boilers, Condensers, Heat Exchangers, Piping



Air Conditioning Cooling Towers, Ice-Making Machines, Evaporating Condensers

Food-Processing Vessels, Pipelines, Gelatin Evaporators

Marine Salt-Water Evaporators and Heat Exchangers

in **dry** easy-to-handle form

Cleaners based on Du Pont Sulfamic Acid are safer, more convenient, non-fuming . . . dissolve in water to form effective, low-corrosive solutions

Now . . . acid cleaners you handle *dry!* No fumes or hazardous liquid spillage to worry about. When mixed with water, these cleaners have all the penetrating power of hydrochloric acid with far less corrosive effect. The key to these unusual properties is a remarkable new ingredient — Du Pont Sulfamic Acid.

Sulfamic acid-based cleaners remove scale and deposits from air conditioning and ice-making equipment; food-processing vessels; steam boilers; milk evaporators and pasteurizers; marine evaporators and heat exchangers. Cleaning action is fast, thorough. Downtime is eliminated in many cases because cleaners are added while equipment is in operation.

We'll gladly send you additional information on sulfamic acid-based cleaners and the names of formulators who offer these new compounds. Just mail the coupon below.

DU PONT
SULFAMIC ACID

DU PONT
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Grasselli Chemicals Dept., Room N-2533
Wilmington 98, Delaware

Please send me ☐ sulfamic acid general equipment cleaning bulletin; ☐ names of formulators offering cleaners based on sulfamic acid.

*Name*_____

*Company*_____

*Address*_____

*City*_____ *State*_____

For more facts circle 621 on Reply Card

NEW PRODUCTS

(Begins on page 186)

reported to have licked the battery drain problem. With transistors in all the IF and audio stages, as well as the power supply of this equipment, battery drain is held to an eighth of the current previously consumed by mobile radios, says manufacturer—with a system in the 24-42 v range, normal operation for an 8-hr day requires less than 6 amp-hr.

The new radiophone is available in models for battery voltages found on industrial vehicles from 6 v d-c on up.

There is also a 117 v a-c model. The power pack is the only determining factor of the various models, so that radio and transmitter portions of the Dispatcher can be used with any of the snap-on power supply packs. Available for vehicles with varying power supplies, is a transistorized regulator which transforms primary power voltage down to a stable input. All mobile units come in two designs, one self contained (shown at left) for installation in a single mounting location near the operator. The other separates radio set from speaker, microphone and controls. Motorola Inc.

32—SCANNER converts drawn curve into voltage

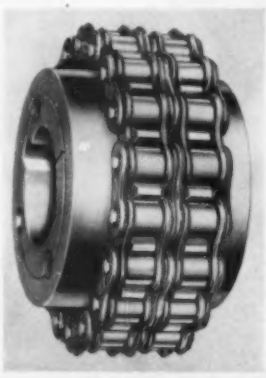
The Program Scanner, a non-mechanical instrument, is designed to convert a curve drawn on graph paper into a voltage to be used to program radiant heat, test load and other control, programming or computing applications. The all-electronic unit operates when a photographic transparency of a curve is inserted in front of the "flying spot" tube which is swept by a vertical line moved horizontally across the face of the tube. The photomultiplier circuit in the scanner acts as a switch, sees "flying spot" during time it is below curve, and turns on and off a Schmidt trigger, which has its output clamped to a glow tube reference to produce constant amplitude, variable width pulses. The unit does not have the same speed limitations as electromechanical devices, company says. Scanner's output is available as a variable width pulse or d-c, with a-c output obtained by adding a converter. Spar Engineering & Development, Inc.

33—ULTRASONIC CLEANER is a self-contained unit

Including a heater, temperature control, filtration and recirculation system in addition to the ultrasonic generating equipment, Model R-50 is a self-contained cleaning set-up in a single cabinet, small enough to be moved about. Overall dimensions are 22 by 19 by 37 in. high. Piping, pump and filter are stainless steel with Teflon gaskets, to make unit suitable for alkaline solutions, solvents, and mild acids. Size of tank itself is 6 by 16 by 11 in. deep, with a total working volume of 5 gal. The transducers mounted to bottom have a rated input of 250 r-f watt average (1 kw peak), which they convert into mechanical vibrations at 38 kc. This high-speed agitation causes cavitation in the liquid to give a gentle, thorough scrubbing action. Branson Ultrasonic Corp.

34—FLEXIBLE COUPLINGS feature taper bushings

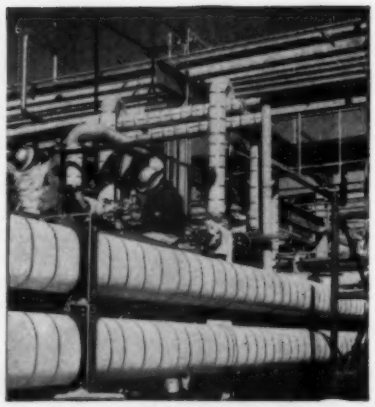
Steel double roller chain shaft couplings by company are now available with interchangeable taper bushings. The taper bushings are supplied with bores in increments of 1/16 in., so that



all standard shaft diameters can be met from stock. According to company, couplings are easily installed on shafts, absorb moderate end play and misalignment, provide long service, and can be coupled and uncoupled by the removal of a single roller chain connecting pin. The complete line of roller chain couplings available ranges from fractional to hundreds of horsepower. Diamond Chain Co., Inc.

35—SUBMERSIBLE PUMP handles both water, muck

This electrical submersible drainer pump is reported to function effectively on heavy-duty water-pumping operations where dirt, grit or other solids are contained in the water—to handle water containing up to 20 per cent solids. It is suggested for filter screen



G-B SNAP-ON DISTRIBUTORS

(See ad on facing page)

ALBUQUERQUE, Mt. States Insulation Co.
AMARILLO, Ball Distributing & Engr. Co.
ATLANTA, Ga., Southern States Iron Roofing Co.
BILLINGS, Mont., Big Horn Supply, Inc.
BIRMINGHAM, Ala., Shook & Fletcher Supply
Southern States Iron Roofing Co.
BROOKLINE, Mass., Homans-Kohler, Inc.
BUFFALO, Industrial Insulation Sales, Inc.
CHARLESTON, W. Va., Baldwin Asbestos Products Co.
CHARLESTON HEIGHTS, S. C., Stafford Insulation Co.
CHARLOTTE, N. C., Guy M. Beaty & Co.
CHATTANOOGA, Guy M. Beaty & Co.
CHICAGO, E. C. Carlson Co.
CINCINNATI, R. E. Kramig & Co.
CLEVELAND, The Miles Materials Co.
COLUMBIA, S. C., Southern States Iron Roofing Co.
COLUMBUS, Santeler Brothers
DALLAS, Insulation Supply Co., Inc.
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DENVER, Gene Wright Lumber Co.
DETROIT, Coon-DeVisser Co.
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LOUISVILLE, General Insulation & Roofing Co.
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NASHVILLE, Southern States Iron Roofing Co.
NEWARK, N. J., Eastern Steam Specialty Co.
NEW HAVEN, Conn., Insulation Supply Co.
NEW ORLEANS, Eagle Asbestos & Packing
NEW YORK, Eastern Steam Specialty Co.
OKLAHOMA CITY, Ball Distributing & Engineering Co.
OMAHA, Cardinal Supply & Mfg. Co.
PHILADELPHIA, John F. Scanlan, Inc.
PITTSBURGH, Dravo Corp.
PHOENIX, Ariz., Kircher Asbestos & Rubber Co.
RALEIGH, N. C., Southern States Iron Roofing Co.
RICHMOND, Va., Southern States Iron Roofing Co.
ROCKFORD, Ill., Mott Brothers Co.
SALT LAKE CITY, Bullough Asbestos Supply Co.
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SAN DIEGO, Western Fibrous Glass Products
SAN FRANCISCO, Western Fibrous Glass Products
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SYRACUSE, N. Y., Industrial Supply Co.
TAMPA, Fla., Eagle Roofing & Art Metal Works, Inc.
TALLAHASSEE, Fla., Baker's, Inc.
TULSA, Okla., Ball Distributing & Engr. Co.
TUPELO, Miss., Paine Supply Co.
WASHINGTON, Walter E. Campbell Co., Inc.
WICHITA, Jamar-Olmen Construction Co.
VANCOUVER, B. C., Fleck Brothers Limited

Where plant production depends on temperature control—insulate with SNAP*ON!

The more process or steam piping you have in your plant, the more reason to use Snap*On—the one-piece pipe insulation molded of fine glass fibers. For Snap*On offers the *highest thermal efficiency at the lowest applied cost of any general purpose pipe insulation on the market* for cold or hot piping up to 350° F.

Thermal efficiency alone makes Snap*On the natural selection in plants where production hinges on piping—yet Snap*On offers many other outstanding advantages. It costs less to apply—"just open the seam and it snaps on the pipe." It's lighter and cleaner to work with. There is no breakage, no waste. It's permanent.

Snap*On is available in one-piece cylindrical sections . . in sizes up to 33" . . . plain or with a complete range of factory-applied jackets for appearance, vapor barrier or weatherproofing. It is stocked for prompt delivery by a nation-wide network of G-B distributors. Use the best —it costs no more.

SEE ADJOINING COLUMN FOR NAME OF LOCAL DISTRIBUTOR OR WRITE FOR COMPLETE INFORMATION

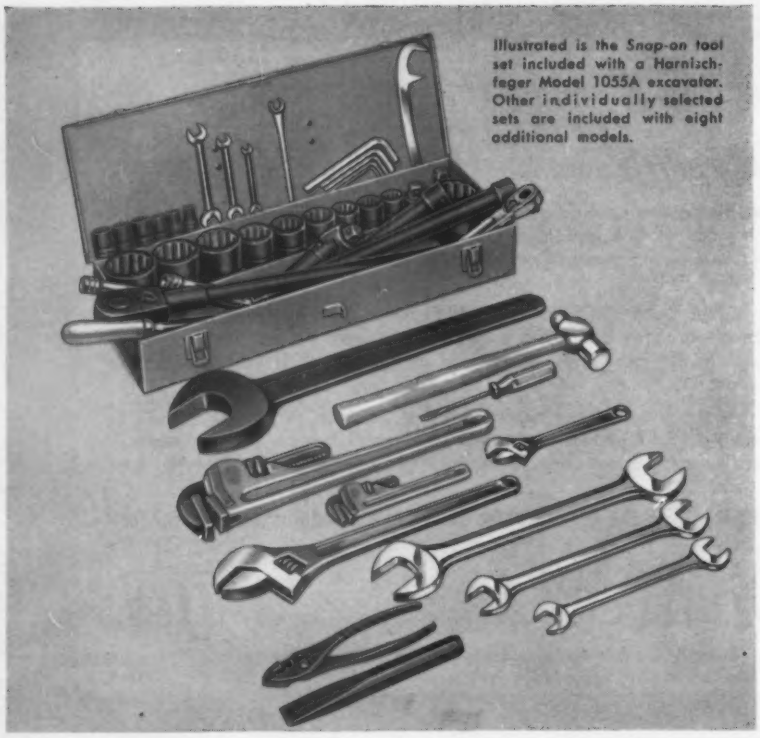
*Trademark Reg.

GUSTIN-BACON *Manufacturing Company* GUSTIN gb BACON

Thermal and acoustical insulations • Molded glass fiber pipe insulation • Pipe coverings and fittings

244 W. 10th ST., KANSAS CITY, MO.

For more facts circle 622 on Reply Card



Illustrated is the Snap-on tool set included with a Harnischfeger Model 1055A excavator. Other individually selected sets are included with eight additional models.

Snap-on lives with an excavator

HARNISCHFEGER provides a hand-picked tool kit

Each *Snap-on* tool kit Harnischfeger Corporation includes with a new excavator is specifically designed for that particular model.

These tool sets are the result of an analysis suggested by R. J. Ripple, *Snap-on* sales engineer. After preliminary discussions, Ripple brought in a wide selection of *Snap-on* open-end wrenches, sockets, Torqometers and other tools. Then, working from the ground up during assembly of an excavator, this *Snap-on* specialist, together with Harnischfeger erection and engineering people, selected by actual trial the proper tools to go with the machine.

The complete survey involved at least eight different models and extended over a period of many weeks.

These tool sets make maintenance jobs faster, easier, and better. In addition, factory engineers now carry only a minimum of extra tools for erecting excavators in the field.

GOT A TOOL PROBLEM? CALL THE *SNAP-ON* REPRESENTATIVE

Tool kits for original equipment, tools for production and maintenance, tools for field service work—whatever the problem, talk it over with your *Snap-on* man. He is a specialist who devotes all of his time to industrial application of nationally accepted *Snap-on* tools. Branch offices and warehouses are located in 54 cities throughout the U.S. and Canada. Consult your phone directory or write us.

SNAP-ON TOOLS CORPORATION

8068-K 28th Ave., Kenosha, Wis.

*Snap-on is the trademark of Snap-on Tools Corp.

For more facts circle 623 on Reply Card

NEW PRODUCTS

(Begins on page 186)

sump service, dewatering of mines and quarries, supplying river water intake and similar applications. The pump operates partly or completely submerged. A built-in thermostatic cut-off protects motor against damage from overheating, obstructions or overloading; an automatic reset restarts pump when trouble is corrected.

The submersible motor operates in a factory-sealed oil bath, and is cooled by discharge water. This heavy-duty squirrel cage, three phase 60-cycle motor is rated 7½ hp. The pump has a capacity of 460 gpm at 15 ft head. With a 70-ft head, the pump handles 145 gpm. It can be used for portable service or permanent installations. Sumo Pumps, Inc.

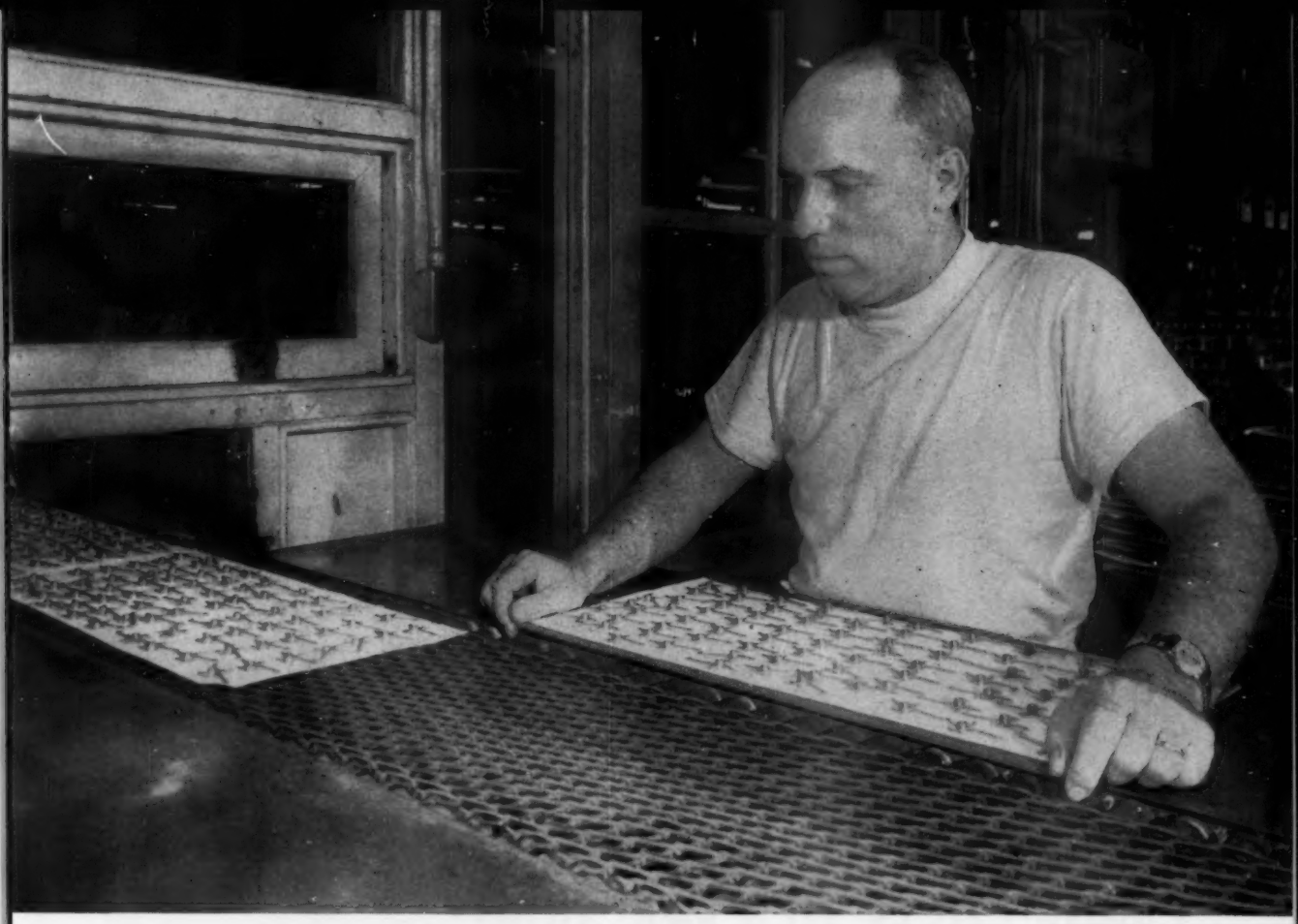
36—COOLING SOLUTION utilizes natural adhesiveness

Crystal Cool is a water soluble lubricant and coolant said to represent a departure from the principle of lubricant-cooling by extreme pressure with petroleum emulsion oils. According to company, it makes use of a natural adhesiveness that results from a chemically generated electrostatic charge. This, it is stated, prevents cooling fluid from building up on the metal to more than one molecule thickness, and this automatic control prevents stickiness and slowdown of machinery. Tests are reported to indicate that the new coolant is especially effective in working titanium. Better finishes, increased speeds and feeds, and improved tool life are reported. According to announcement, it may be water diluted up to 60 to 1. Clinton Chemical Co.

Reader Service Cards On pages 245-246 make it easy to get further information on any of these products. Just circle the item numbers of the products you would like to know more about.

37—RUBBER GLOVES offer high resistance properties

These synthetic rubber gloves are compounded to give extra-long wear with good resistance to abrasion, punctures, snagging, and extreme temperatures. They are claimed to have remarkable resistance properties in virtually all industrial greases, oils, solvents, and chemicals. They are especially recommended by manufacturer for use with



At National Cash Register, Wissco Belts carry small parts for accounting machines and cash registers through a brazing furnace at 2070° F. Belts are in operation 24 hours a day, 7 days a week.

FAMOUS NAMES *ride on* WISSCO BELTS

The National Cash Register Company

The story of Wissco Belts is best told by their users. For instance, Mr. Charles E. Mentel, Foreman of the Heat Treating Department, The National Cash Register Company, Dayton, Ohio, says:

"Our Wissco Belts last from 20% to 25% longer, and require less down time to remove slack."

These belts are used in a high temperature operation for copper brazing 3,000 different accounting machine and cash register parts. "The Wissco Belts pass through the furnaces 24 hours a day, 7 days a week," Mr. Mentel explains. "They are alternately subjected to a temperature of 2070° F. within the furnace and room temperature outside, the complete heating cycle taking 7 to 20 minutes. This continuous heating causes a definite stretch to develop in the belts; to take up slack we remove a section of the belt. Wissco Belts last from 4 to 6 months before we find it necessary to replace them, during which time they are cut about three times. The belts we used formerly lasted from 3 to 5 months and sections usually had to be cut out at least six times before replacement."

"Our Wissco Belts have withstood the extreme changes of temperature, retaining their original shape with a minimum of distortion," Mr. Mentel adds. "We have been using them since 1933."

Longer service life... less down time... more economical performance under adverse conditions—important cost-cutting factors in any conveying or processing operation.

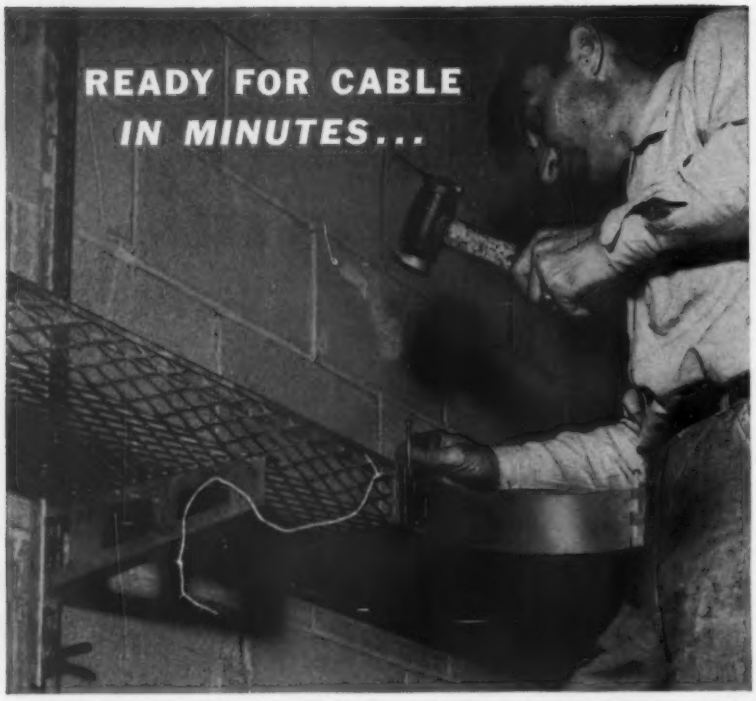
5432

WISSCO BELTS
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

CF&I

THE COLORADO FUEL AND IRON CORPORATION • Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION • Atlanta • Boston • Buffalo • Chicago • Detroit
New Orleans • New York • Philadelphia • CF&I OFFICES IN CANADA: Montreal • Toronto

For more facts circle 624 on Reply Card



An aluminum coupler plate and two steel pins do the job—with Cope's patented pin-type coupler.

COPE CABLE TROUGH CUTS LABOR COSTS TO A FRACTION!

Three simple parts—an aluminum coupler plate and two steel pins—are all it takes to connect complete sections of Cope cable *trough* . . . and in less than half the time required to connect two lengths of conduit. Furthermore, because each 24" width of trough supports as much cable as *sixteen* lengths of 4" conduit, you can sometimes actually reduce labor time *and costs* by almost 60% for the complete job!

Space Saving Flexibility. Design and construction features of lightweight, easy-to-handle Cope cable supporting equipment speed installation of space saving systems—even in the most cramped quarters.

A complete line of system accessories and fittings allow for necessary changes in direction or elevation. Supporting riser elbows, trough to box connectors, and drop outs provide maximum flexibility of installation to meet system requirements . . . reduce design time up to 25% for laying out your system.

Cut Costs Three Ways. You save *three ways* when you specify Cope cable supporting systems with pin-type coupler . . . trough, ladder, or channel.

- **LOWER FIRST COST**
- **LOWER INSTALLATION COSTS**
- **LOWER SYSTEM MAINTENANCE COSTS**

Discuss these advantages for *your* installation with a qualified Cope representative—or write to T. J. Cope Division, Rome Cable Corporation, Collegeville, Pa.

1001

T. J. COPE *Division*

ROME CABLE CORPORATION

For more facts circle 625 on Reply Card

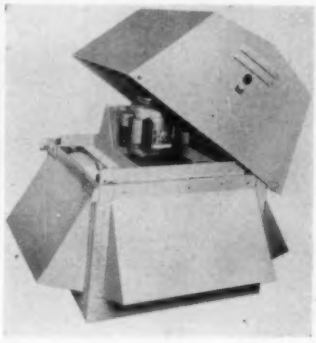
NEW PRODUCTS

(Begins on page 186)

aromatic and aliphatic hydrocarbons. The gloves are available in sizes 7 through 9 in light and medium weights; sizes 9, 10, 11 in heavy and extra heavy weights. All gloves have pebb'e firm-hold finish for a firm, non-slip grasp. The gloves are also made from natural rubber, Latex, Neoprene, and Compar plastic. The Wilson Rubber Co.

38—ROOF VENTILATOR has various motor selections

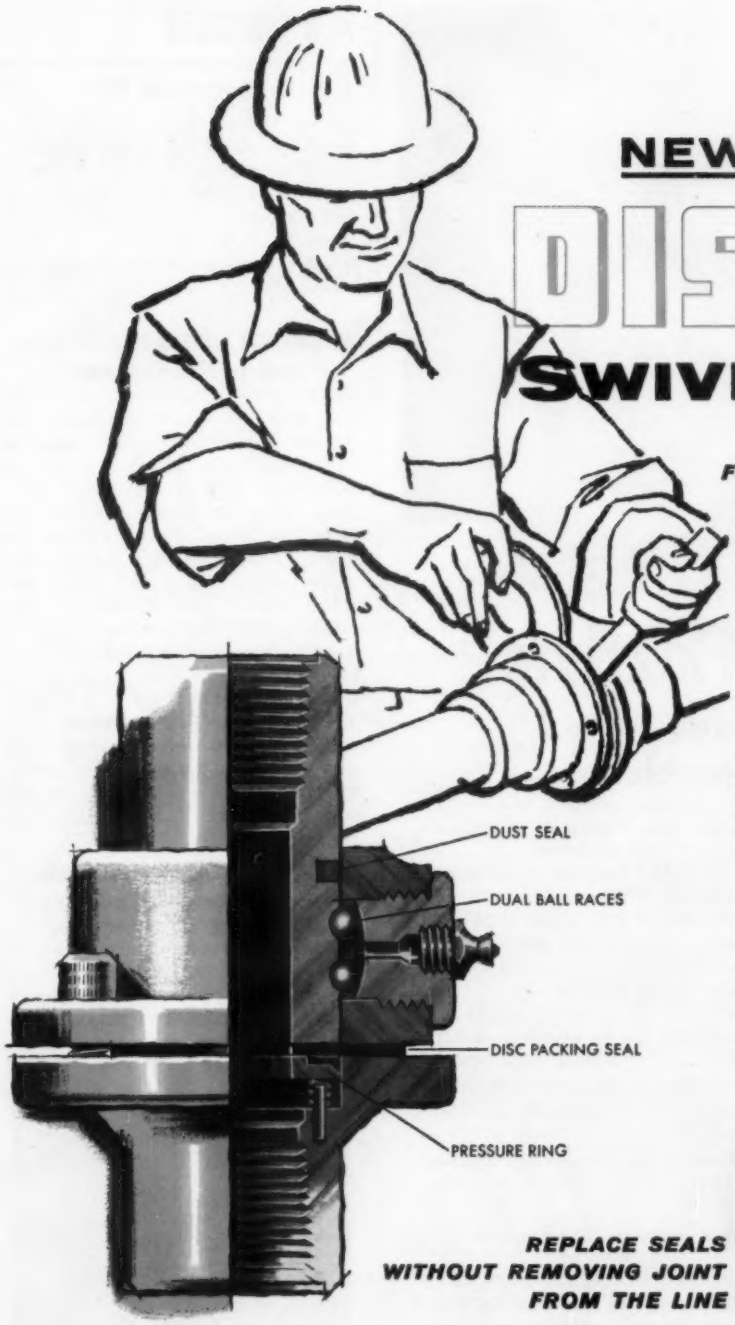
This PFMA-rated direct drive centrifugal roof ventilator has various motor selections: single phase, 115/230 v, 60 cycle; three phase, 220/440 v, 60 cycle; and specially designed motors, including totally enclosed and explosion-proof power units. Horsepower sizes are from 1/10 to 10 hp. Wheel diameters range from 12¼ to 36½ in., and capacities are from 1,100 to 25,000 cfm. Features include backward curve wheels, dynamically balanced and taper-locked to the shaft; spun venturi inlet which affords quietness and high efficiency and helps unit operate with near centrifugal blower characteristics; and weathertight construction. The Peerless Electric Co.



39—REGULATOR-FILTER-LUBE is one compact unit

Designed to regulate to desired pressure, filter water and air from the air line and lubricate air stream with a fine fog-like oil mist, this three-in-one combination regulator-filter-lubricator is ready to install and requires only two connections. Regulator operates on a balanced piston principle. Automatic bleed-off serves to permit sensitive pressure reduction without bleeding down-stream line. Regulator is designed to furnish accurate regulation to 0, where it serves as a shut-off valve. Pressure gage of 0 to 200 lb is included. Cyclonic action within the filter bowl removes dirt and water; a second filtering takes place as air

NEW CHIKSAN DISCPAK SWIVEL JOINTS

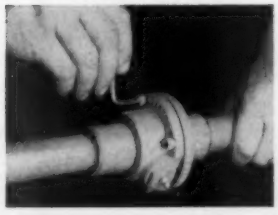


FOR STEAM AND HOT GAS SERVICE

Created specifically for service on lines employed in steam and hot gas service, the Chiksan Discpak embodies a new construction design which permits packing units to be replaced without removing the joint from the line. The outer housing of the Discpak is cut apart at the packing chamber and both ends are flanged at the cut. Four allen-type cap screw bolts are used to secure the flanges. A disc-seal, housed between the two members, provides a fluid-tight seal between rotating and stationary members of the Discpak Swivel Joint. A spring loaded pressure plate holds the packing in sealing position against the swiveling member.

The new Discpak has a maximum temperature rating of 600° F. and a maximum pressure rating of 300 psi. All turning movement in the Discpak takes place on a double row of precision ball bearings. Write today for literature and prices. If your plant or equipment lines utilize hot gas or steam, it will pay you to know about this new field-proven Discpak swivel joint.

REPLACE SEALS WITHOUT REMOVING JOINT FROM THE LINE



To replace the disc-seal, simply remove four allen screws and spread line slightly with a flat metal bar.

CHIKSAN

CHIKSAN COMPANY, 330 No. Pomona Avenue, Brea, California

A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION

fmc

Please rush me a copy of your new Discpak Bulletin

NAME_____

COMPANY_____ TITLE_____

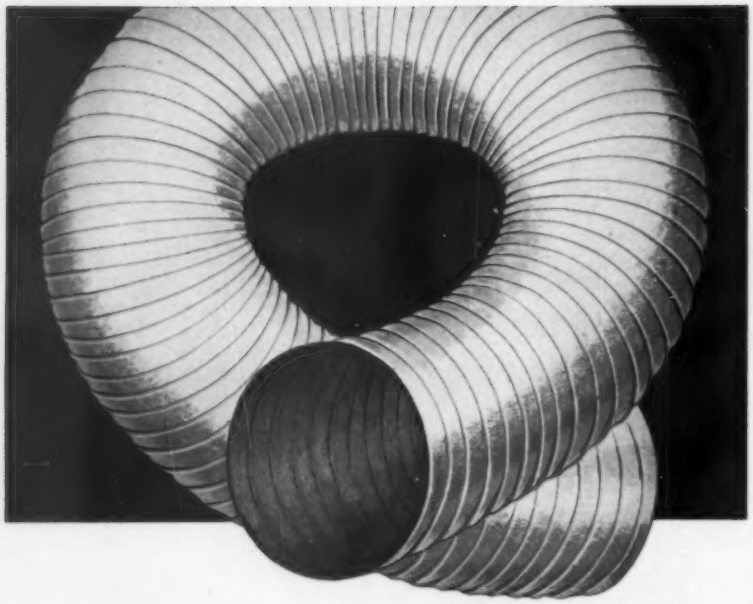
CITY_____ ZONE____ STATE_____

SEND FOR BULLETIN

New Discpak Bulletin 100 describes in detail the many features of this new swivel joint including full mechanical specifications.

57-26

For more facts circle 626 on Reply Card



facts about Flexflyte®

that will help you solve your ducting problems

What is Flexflyte?
A lightweight, reinforced ducting made of a spring steel wire helix covered with coated fiber glass or a cotton fabric and bound with a fiber glass cord.

What are its applications?
Flexflyte is used for transmission of hot or cold air, fume removal, dust collection, materials handling, etc.

How flexible is Flexflyte?
It will take tight turns at any point up to 180° without buckling. No elbows or fittings are required.

Can Flexflyte be engineered for unusual applications?
Yes. Special fabrics, coatings, connections, lengths and diameters are available. Our special Silicone Department, working with automated machinery, is prepared to meet any requirement for silicone ducting.

Is it flame resistant?
Flexflyte has exceptionally high flame resistance and will not support combustion.

What about Flexflyte's resistance to abrasion?
It is highly resistant to abrasion, especially when coated with FT-506 which has more than 200 times the abrasion resistance of any tubing of its type and weight.

What about installation?
Flexflyte is quickly, easily installed by means of metal clamps. It is also available with special enlarging or reducing ends, either cylindrical, rectangular or polyhedral.

What are its temperature ranges?
From minus 120°F. to plus 650°F.

What pressures will Flexflyte handle?
Internal working pressures up to 70 psi and external working pressures up to 15 psig according to type.

How can I make sure that Flexflyte will solve my problems?
Write us, outlining your requirements. Our engineers will be glad to put their experience to work for you. Write Dept. 9N.

Sold through industrial distributors from coast to coast.

Flexible Tubing
CORPORATION
GUILFORD, CONNECTICUT • LOS ANGELES 64, CALIFORNIA
For more facts circle 627 on Reply Card

NEW PRODUCTS

(Begins on page 186)

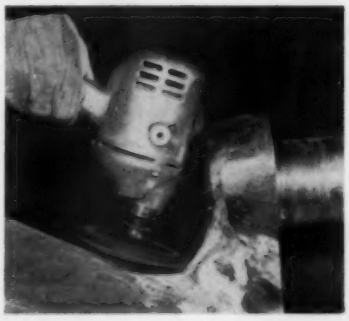
passes through filter cartridge. External oil adjustment meters lubricant, which automatically enters air stream as an oil mist, ideal for pneumatic tools and equipment. The unit is available in ¼ to ¾ in. pipe sizes. Brochure 80 gives more information on it Perfecting Service Co.

40—BLAST GRIT is free of silica, and is cleaner, too

Black Beauty Blast Grit is announced as a safer and cleaner material recommended for cleaning vats, castings, tanks, buildings, stainless steel and non-ferrous metals. According to company, it is practically dustless and silica-free. It is also reported to cut faster because of its diamond-like, sharp cutting edges that leave surfaces cleaner, with no deposits that might impair the bonding action of a surface covering. Another advantage claimed is that it flows freely in any kind of weather, will not rust or pack, will not clog or foul machines and is completely inert. Free envelope samples are offered for purpose of selecting one of six grades available for etch desired. H. B. Reed & Co., Inc.

41—MUSHROOM DISCS improve contour polishing

For contour grinding or polishing small radii or difficult contours with portable tools, a mushroom shaped molded rubber pad and coated abrasive discs are introduced in diameters of 5 and 8 in. They are designed specifically for getting into contours where



disc pads of conventional type may not perform effectively. With the new pad, it is claimed possible in many cases to do an entire contour in one operation. Also, swirl marks and gouges are said to be virtually eliminated, so that finishing operations may not be needed.

Discs are held to the pad by an adhesive packaged in tube applicators. Abrasive discs are made of Resinall

For more facts circle 628 on Reply Card →

WHAT?

AB-I's prevent single phasing?

SURE! No more motor burnouts or other equipment damage caused by fusible protective devices opening only one phase in a polyphase circuit. With a Westinghouse AB-I circuit breaker, *all* lines are opened *every* time on circuit faults. A common trip bar breaks all contacts simultaneously. If you are going to provide protection for equipment, it makes sense to provide *complete* protection. Circuit breakers not only prevent "single phasing", but they are sealed at the factory so that unauthorized personnel can't enter and "bridge" circuits. Then, too, you know that Westinghouse circuit breakers will operate properly because every one is completely tested at the factory.

Too expensive? NO! In many cases, Westinghouse AB-I circuit breakers actually cost less than safety switches.

Get the complete story from your Westinghouse distributor. Ask him for Descriptive Bulletin 30-250 or write: Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-30268

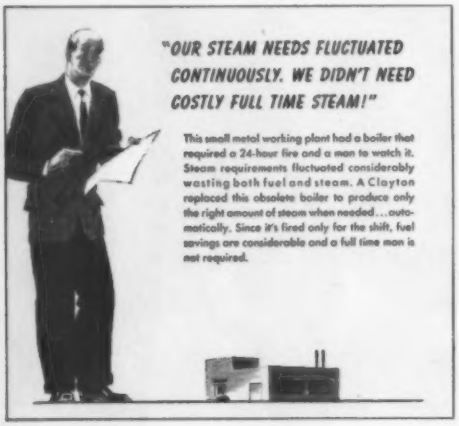
YOU CAN BE SURE...IF IT'S

Westinghouse

How a Clayton STEAM GENERATOR SOLVED THREE different STEAM PROBLEMS!

"WE WERE FACED WITH AN OBSOLETE CENTRAL BOILER ROOM AND DETERIORATING TRANSMISSION LINES"

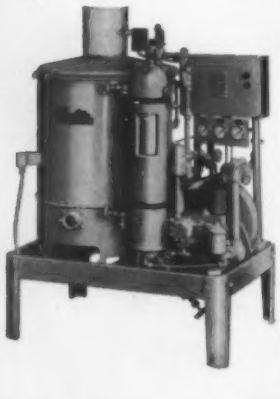
This well known chemical company had a sprawling plant with long transmission lines and condensation problems. Fluctuating steam needs throughout the plant made steam production a problem. The ordinary boiler had to be kept at full pressure all day... fired all night. Seven Clayton Generators strategically located now provide just the right amount of steam—when and where needed. They are shut down at night. These seven Clayton generators installed cost less than the cost-of new transmission lines.



"OUR STEAM NEEDS FLUCTUATED CONTINUOUSLY. WE DIDN'T NEED COSTLY FULL TIME STEAM!"

This small metal working plant had a boiler that required a 24-hour fire and a man to watch it. Steam requirements fluctuated considerably wasting both fuel and steam. A Clayton replaced this obsolete boiler to produce only the right amount of steam when needed... automatically. Since it's fired only for the shift, fuel savings are considerable and a full time man is not required.

These actual case histories represent only a few of the reasons why smart business men buy Clayton Steam Generators. Basically the story is more steam at less cost in only one fourth the space occupied by ordinary steam boilers. They cost less to install too... no stacks to erect, no walls to knock out, lower rigging expense and lower hauling costs. The secret of Clayton's higher efficiency is *controlled circulation*—no space consuming straight tubes, but instead, a principle of using a coil without fired vessels... easier to operate and maintain. From a cold start, Claytons produce steam in 3 minutes. Let a Clayton representative give you the complete facts.



"IT WAS HOPELESS! WE NEEDED MORE STEAM AND WE DIDN'T HAVE ROOM FOR IT!"

Here was a well known beverage syrup company located in "midtown" squeezed in between buildings on all sides. To meet its additional steam needs, it went in only one direction ...up! Since a Clayton produces the same amount of steam in only one fourth the space and weighs only a fraction as much as an ordinary boiler, it was relatively simple to put two Clayton steam generators on the roof! The installation was quick and inexpensive.

EXCLUSIVE!

Compare Clayton's 5-year published coil warranty covering material and labor.

Clayton MANUFACTURING COMPANY

Sirs:

Please send us more information on Clayton Steam Generators.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

We use steam for_____

Send to: Clayton Manufacturing Company
401 N. Temple City Blvd.
El Monte, California

For more facts circle 629 on Reply Card

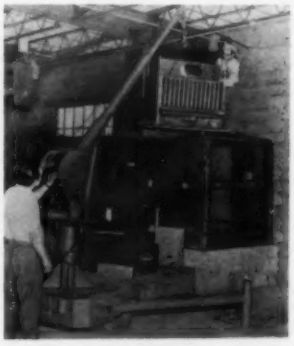
NEW PRODUCTS

(Begins on page 186)

Metalite cloth, an aluminum oxide abrasive with an all-resin bond, in grits 120-X, 80-X and 50-X. Pads of 5- and 8-in. diam are made in proper density for polishing; a third mushroom pad in the 5-in. diam is made in a harder density for stock removal. All may be used on portable pneumatic or electric grinders. Behr-Manning Co.

42—SMALL INDOOR CRANE for maintenance, lifting

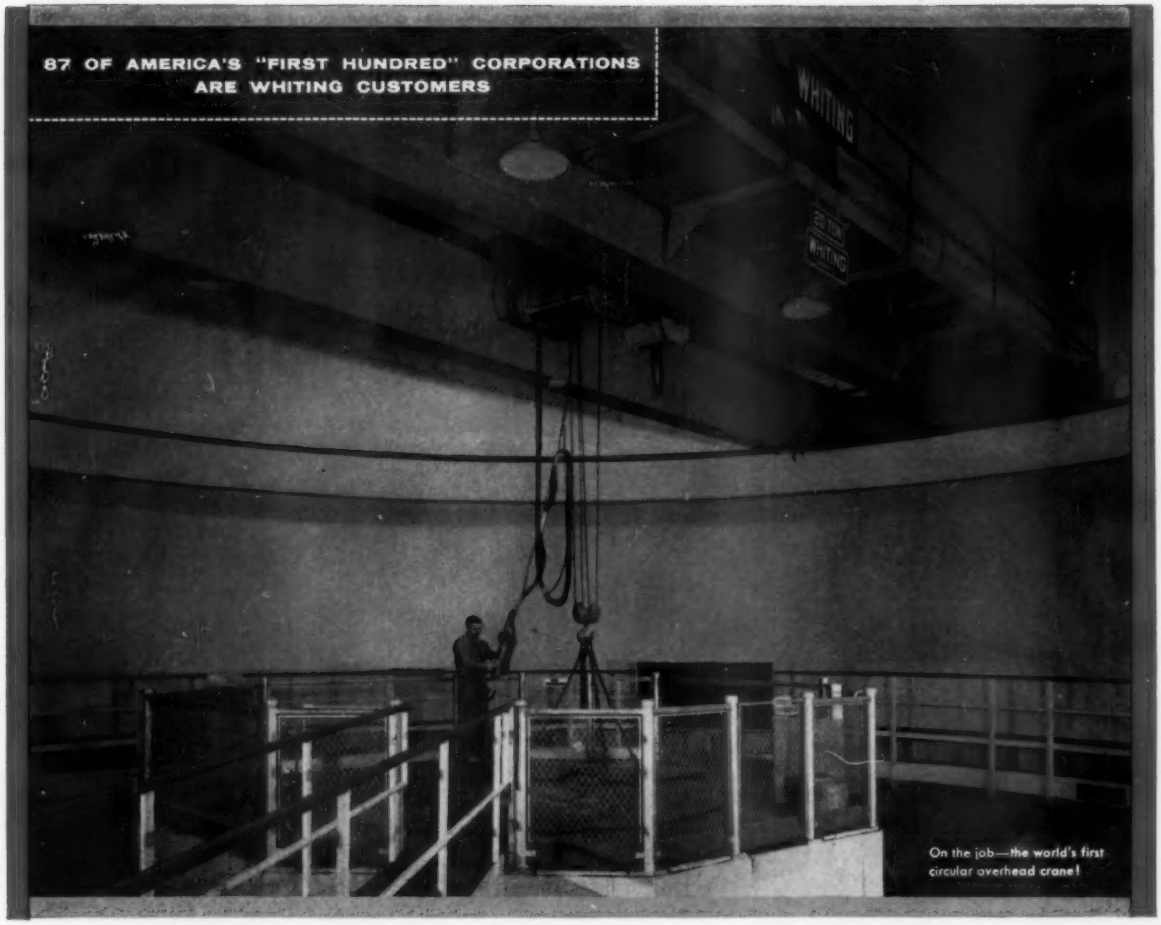
Mighty Midget, Model I-18, requires only one operator and has a lifting capacity up to 2000 lb. Its boom is



raised by a manually operated hydraulic pump, and rotates 360 deg. with a reach of 18 ft. It is mounted on a speed truck, with out-riggers to maintain balance under heavy lifting conditions. The crane is designed for speedy operation and its compactness lets it operate in close quarters. P. A. Radocy & Sons, Inc.

43—CONTROL CENTER for groups of a-c motors

The Class 11-350 Control Center houses control for three-phase a-c systems at 220 v (1-100 hp) and 600 v (1-200 hp). All controls are centralized in one group of stationary, interchangeable enclosures, each with a grouping of modular starter units. Individual structures are 90⅜ in. high and 20 in. wide, and may be combined in straight-line, L-shape or U-shape assemblies. They are available for both front mounting and back-to-back mounting of controls, in NEMA 1 indoor or NEMA 3 outdoor weather-resistant enclosures. Each structure contains a main horizontal three-phase bus lowered 12 in. from the top, and a three-phase vertical bus for distribution of power to starter units. Starter units are available in NEMA Type A with no terminal, NEMA Type B with individual terminal blocks on each



At Argonne National Laboratory... the cranes that "couldn't be built!"

The world's first circular overhead cranes are at work, today. They're giving science a "lift" in two separate atomic projects at the Argonne National Laboratory, Lemont, Illinois. Operating on circular runways, each crane pivots about its axis, can reach everything within the building it serves. New in concept, these cranes that "couldn't be built" exemplify Whiting engineering ingenuity . . . prove again Whiting's ability to solve the most challenging overhead handling problems. Whether your needs call for the unique or the conventional, Whiting engineering custom-designs and builds the crane that will serve you best! *Whiting Corporation, 15675 Lathrop Avenue, Harvey, Illinois.*

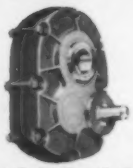
For complete information, request our new full-color Bulletin 90, "Whiting Circular Overhead Cranes for Atomic Energy." Also available upon request, Bulletin 80 talks about Whiting cranes in general, shows why they are Industry's standard.

WHITING CRANES

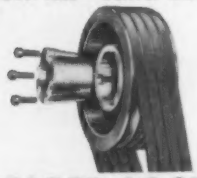
MANUFACTURERS OF CRANES; TRAMBEAM HANDLING SYSTEMS; TRACKMOBILES; FOUNDRY, RAILROAD AND CHEMICAL PROCESSING EQUIPMENT

For more facts circle 630 on Reply Card

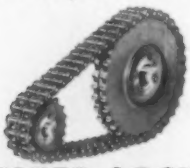
DODGE PRODUCTS you should know



TORQUE-ARM
SPEED REDUCERS
Cost less—deliver more!



TAPER-LOCK
SHEAVES
Easy on—easy off! Mount flush!



TAPER-LOCK
SPROCKETS
No reboring—no waiting!

Write for Bulletins!

- Torque-Arm Speed Reducers. 15 sizes—1 to 100 hp. Bulletin A-637
- Taper-Lock Sheaves. Drive tables and technical data. Bulletin A-661
- Taper-Lock Sprocket and Dodge Roller Chain data. Bulletin A-644

DODGE MANUFACTURING CORPORATION
2700 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

For more facts circle 631 on Reply Card

NEW PRODUCTS

(Begins on page 186)

starter, or NEMA Type C with individual unit terminal blocks and complete factory wiring to master terminal blocks at top or bottom of each structure. Westinghouse Electric Corp.

44—STEEL BOLT features plastic locking action

The self-locking Nylok Bolt is intended to provide a four-way answer to the problem of bolt assemblies. According to company, the bolt locks wherever wrenching is stopped, and is vibration-proof, liquid tight and adjustable. Locking takes place by means

of a permanent nylon plug in the side of the bolt, company explains; the nylon plug wedges opposite mating threads together and locks whether or not bolt has been seated. Designed to withstand extreme vibration, the bolt "grows" tighter hours after applied, because of the "plastic memory" of the nylon plug which causes it to seek its original shape after being spread out during wrenching. Manufacturer says that the nylon plug, when properly seated, blocks fluid flow around the helix threads, and that the plug is resistant to moisture and ordinary solvents, and provides a permanent seal. Used for adjustment, the bolt can be backed off and wrenched tight repeatedly, it is noted. Sizes from No. 10 to 1-in. diam offered. Bolt & Chain Div., Republic Steel Corp.

45—OILER for lubricating the small, hard-to-reach parts

Called the pinpoint oiler, this simple, inexpensive device was designed for those applications where use of the conventional oilcan is impractical because of its larger size. It is claimed ideal for lubrication of miniaturized components and fine instrumentation. The oiler consists of a transparent plastic cylinder 3 in. long, ⅜ in diam, to which a needle resembling a hypodermic's is attached. Needle projects from the cylinder more than an inch, enabling lubrication of otherwise inaccessible spots. Diameter of the needle is only 0.035 in. Pressure on the plastic container delivers a fraction of a drop at a time.

The container can be refilled and used indefinitely. To prevent oil loss when not in use, a small plastic cap fits over the orifice of the needle. The entire extension is protected by a screwed-on fountain-pen type cap. You can get the oiler empty, or filled with a light oil. Diversified Trading Co.

46—DUST COLLECTOR is wet, scrubber-type unit

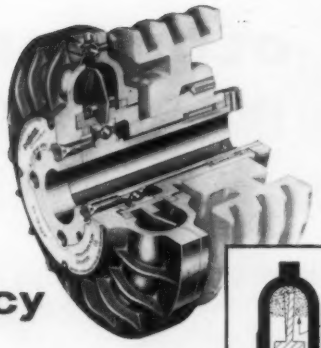
The Type IC Hydro-Filter is primarily designed for use where more than one dust collector will be used, or a common settling tank or sludge basin is employed. It is cited as offering several advantages, among them the use of a common settling tank or basin and of a single sludge conveyor for several collectors, with resulting sludge collection operations and equipment centralized for more economical pick-up and disposal. Longer settling time is derived with larger settling area to provide improved collection performance, it is noted, and lower fresh water consumption is realized. The Type IC Hydro-Filter can be elevated above floor level. Like other models in company's Hydro-Filter line, this collector operates under an air-scrubbing principle in which glass spheres are used in the separation action and no moving parts are within collection area. National Dust Collector Corp.

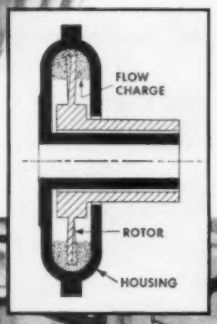
One of these products may be "just what you're looking for." Use the handy Reader Service Cards to ask for more information on it.

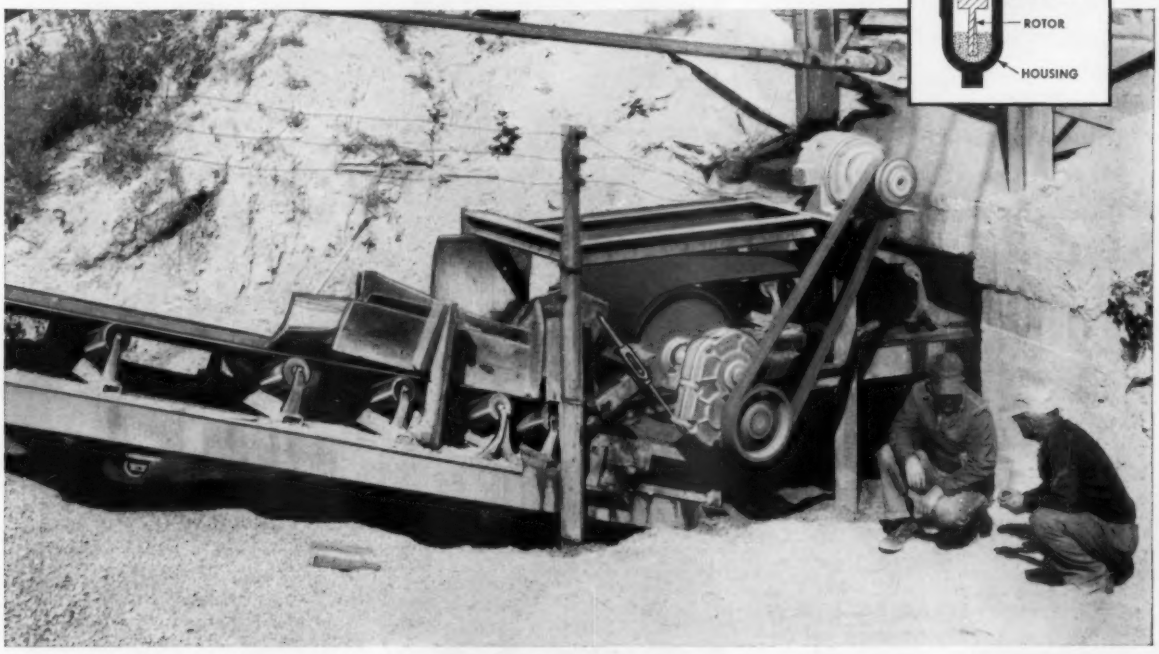
47—GRAY TINTED GLASS reduces the glare

Industrial Lo-tran is said to retain all characteristics of a quality glass important to industrial buildings while varying in quality. Its heat absorbing properties are described as the equivalent of ¼-in. heat-resisting plate glass with approximately 58 per cent absorption of total solar energy. Transmission of visible light or glare is limited to 12.5 per cent as compared with 92 per cent for so-called clear glass, manufacturer announces. The neutral tint almost totally eliminates "see-in" ability under normal daylight conditions, it is stated, yet permits the person inside to see out perfectly

This new drive starts loads smoothly... with smaller motors ...and gives 100% efficiency at full load!







FLEXIDYNE

THE DRY FLUID DRIVE

This tunnel conveyor, 225 feet long, handles 500 tons of sand and gravel per hour—8 to 16 hours a day.

With Flexidyne, the motor picks up the load easily and smoothly. Power investment is reduced, power costs cut, maintenance simplified and conveyor belts are protected against breakage.

Flexidyne, the Dry Fluid Drive, is the *new* development that starts loads smoothly, that protects against shocks and overloads, that saves power and that gives 100% efficiency at full load!

The "dry fluid" in Flexidyne is heat treated steel shot. A measured amount, called the flow charge, is contained in the housing, which is keyed to the motor shaft. When the motor is started, centrifugal force throws the flow charge to the perimeter of the housing, wedging it between the housing and the rotor which transmits power to the load.

After a momentary slip between housing and rotor, the two become locked together and achieve full load speed without slip and at 100% efficiency during the running cycle. Changes in weather—hot or cold—inside or out—do not affect operation of Flexidyne.

Flexidyne is now available in 8 sizes—for use with electric motors and internal combustion engines from 1 hp to 300 hp. While each size is power rated, the flow charge can be varied at will to give tailor-made torque for your particular job. Write for Bulletin A-640.

DODGE MANUFACTURING CORPORATION
2700 Union Street, Mishawaka, Indiana

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in in your classified phone book, or write us.

DODGE
of Mishawaka, Ind.

For more facts circle 632 on Reply Card

NOW···GLOBE OFFERS···
two new INTERCHANGEABLE trays
for support of cables, wiring and tubing

★ Engineered for uniform design and easy installation
★ Steel or aluminum construction
★ Complete accessories for SPEEDIER Installation
★ No sharp edges to damage cables
★ Complete interchangeability

Now, for the first time, two types of cable trays, one a ladder type and the other a basket type, are available to be used INTERCHANGEABLY at any given location, depending on the type and weight of the cables to be suspended. The advantages of each type tray can thus be used to the fullest extent. Globetray, the ladder type, is intended for use where festooning is not a problem, while Cable-Strut, the basket type, is intended for the support of communication wire, instrument tubing and control cables in automation applications.

These two cable trays have been thoroughly field tested in hundreds of large industrial installations, in new plant construction, in power plants, in modernization, and for power distribution in all types of manufacturing processes. A new catalog, just off the press, gives full information and installation techniques. Ask for your FREE copy today.

Distributors are to be found in all principal cities—consult the yellow pages in your phone book under "Gratings" or "Conduits" for the one nearest you.

109

PRODUCTS DIVISION

The **GLOBE** *Company* MANUFACTURERS SINCE 1914

4016 SOUTH PRINCETON AVENUE, CHICAGO 9, ILLINOIS

For more facts circle 633 on Reply Card

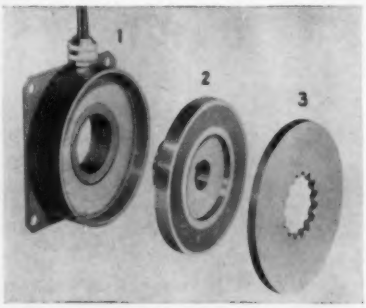
NEW PRODUCTS

(Begins on page 186)

under controlled conditions. It is also claimed that color is not distorted, and more restful vision is achieved because Lo-tran adds to contrast between colors. Use of Lo-tran is suggested for all building exposures, because even hazy overcast skies or direct north light may create a higher brightness than ordinary sunlight reflected from ground surfaces. Sizes range up to 60 by 38 in. Houze Glass Corp.

48—MAGNET CLUTCH features high torque values

This stationary magnet clutch incorporates three main parts: 1) magnet body, 2) drive member, 3) driven member. Sizes range from 1⅜ in. diam to 5 in., with torque ranges from 25 oz in. to 170 in. lb. All clutches are



wound for direct current, with maximum ratings ranging from 28 v on the smaller clutches to 90 v on the larger sizes. Outstanding features claimed are the stationary magnet that eliminates collector rings; high quality friction linings that give high torque values; simplicity of design, making it easy to adapt to machine tools, electronic computers, motion picture cameras, and other uses. Bulletin 504 gives details. Stearns Electric Corp.

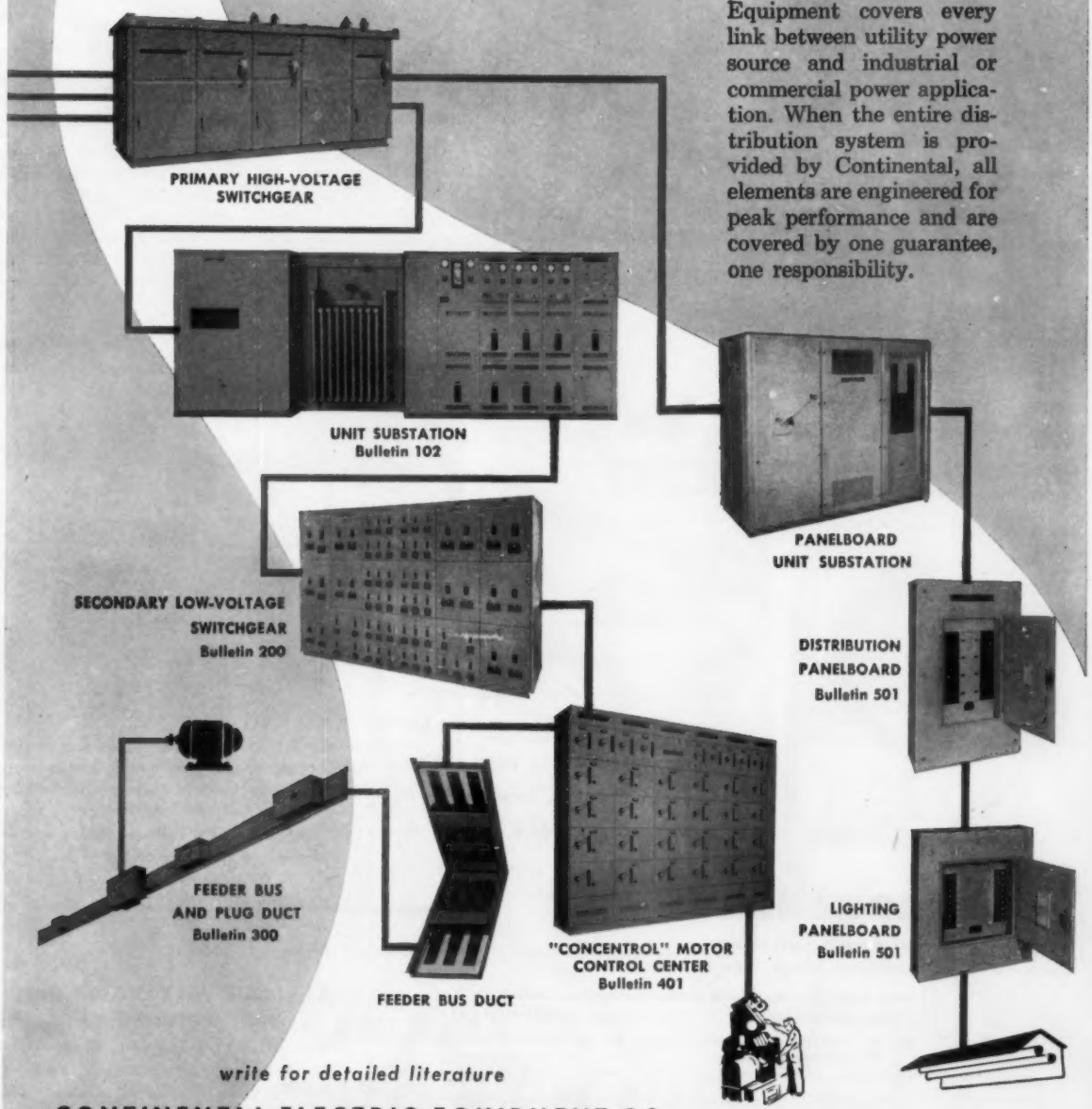
49—LEVEL INDICATOR measures with ultrasonics

The ultrasonic pulse-ranging principle of liquid level measurement utilized in the Model 300 Echogage is designed to eliminate need for floats, linkages, synchros, or any moving parts. The gage is designed to indicate liquid levels in storage tanks and dewar vessels for corrosive chemicals, liquefied petroleum gases, liquid carbon dioxide, oxygen, and all cryogenic liquids, and is also suggested for applications requiring precise location of demarcation line between immiscible liquids.

Liquid level is read directly in feet on a large meter provided with two ranges to accommodate tanks up to 15

The Path of Power through CONTINENTAL Equipment

Continental Electrical Distribution and Control Equipment covers every link between utility power source and industrial or commercial power application. When the entire distribution system is provided by Continental, all elements are engineered for peak performance and are covered by one guarantee, one responsibility.


PRIMARY HIGH-VOLTAGE SWITCHGEAR
UNIT SUBSTATION Bulletin 102
PANELBOARD UNIT SUBSTATION
SECONDARY LOW-VOLTAGE SWITCHGEAR Bulletin 200
DISTRIBUTION PANELBOARD Bulletin 501
FEEDER BUS AND PLUG DUCT Bulletin 300
FEEDER BUS DUCT
"CONCENTROL" MOTOR CONTROL CENTER Bulletin 401
LIGHTING PANELBOARD Bulletin 501

write for detailed literature

CONTINENTAL ELECTRIC EQUIPMENT CO.

General Offices: 206 W. 4th St., Cincinnati 2, Ohio

Plants in Ludlow, Ky., Tampa, Fla., and Cincinnati, O.

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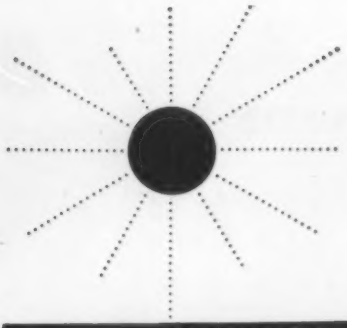


HOT

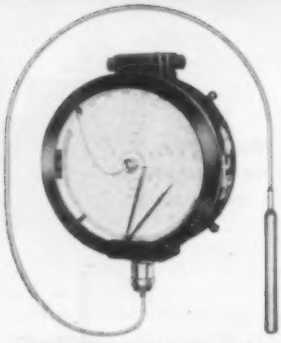
–30° TO 1100° F. OR

COLD

WITH PARTLOW
THE TEMPERATURE IS
PRECISION-CONTROLLED

partlow

THE PIONEER IN MERCURY THERMAL CONTROLS



Recording Temperature Control

Degrees mean dollars. That's why Partlow Controls are used in more and more applications where temperature control is critical. Their pin-point accuracy insures positive protection for materials and equipment. Partlow Controls are precision-built for use with gas, oil, steam or water valves; or electrical equipment. Available in 9 standard ranges, from –30° F. to 1100° F.

THE PARTLOW CORPORATION
Dept. PE-1157, 2 Campion Road, New Hartford, N. Y.

We'd like to know more about Partlow Temperature Controls.
☐ Have representative call. ☐ Send us your CONDENSED CATALOG.
We are interested in Partlow Controls for the following applications:

Company
Street and Number
City State
Signed

For more facts circle 635 on Reply Card

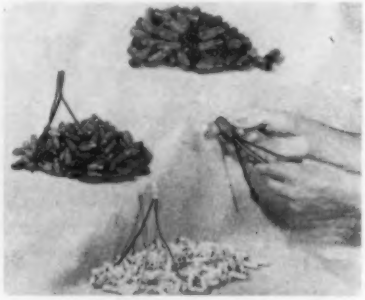
NEW PRODUCTS

(Begins on page 186)

ft high. A built-in calibration feature serves to assure correct level readings despite changes in velocity of sound propagation caused by varying temperatures, specific gravities, and similar differences between liquids being gaged. One common indicator will gage as many as six transducer-equipped tanks, company says, within a radius of 1500 ft. Additional tanks can be accommodated by using auxiliary switch. Indicator is fully transistorized, uses only 5 w of 120 v, 60 cycle power. Bogue Electric Mfg. Co.

50—WIRE CONNECTORS are pre-insulated spring type

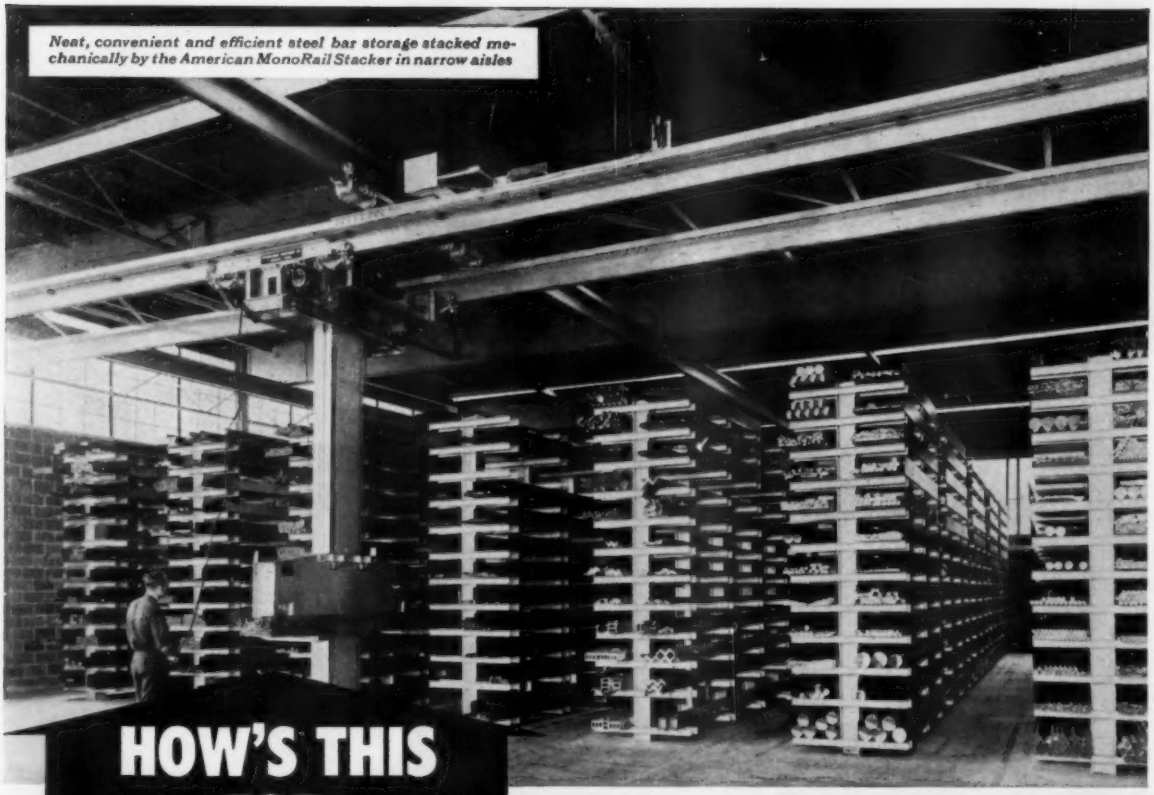
Recent additions to company's Scotchlok brand of electrical connectors are the Type Y (yellow) a fixture connector, and the Type B (blue) a heavy duty connector. With the existing Type R (red) connector, the three sizes accommodate AWG wire sizes from No. 6 through 18 in over 400 combinations, it is pointed out. The connectors consist of a cone-shaped coil spring within a steel sheet to prevent crushing in junction boxes. The vinyl insulating jacket, molded over the unit,



features a triangular cross-section for a better finger grip during application. It also includes a skirt at the bottom to protect the wires and prevent flashover. In use, the connectors are simply twisted on the ends of the wires to be spliced—the cone-shaped spring construction providing threads and gripping the wires firmly. Minnesota Mining and Mfg. Co.

51—FOUR-WAY VALVE for high pressure liquids, gas

This 10,000-psi four-way valve series comes in pipe sizes from ¼ to 1 in., but may be had with tube, AND 10050 or special high pressure connection. Manufacturer says it will withstand surges up to 15,000 psi without damage to its sealing qualities and is designed for a burst pressure

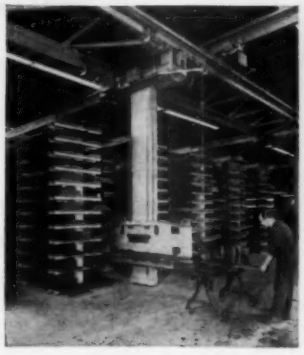


Neat, convenient and efficient steel bar storage stacked mechanically by the American MonoRail Stacker in narrow aisles

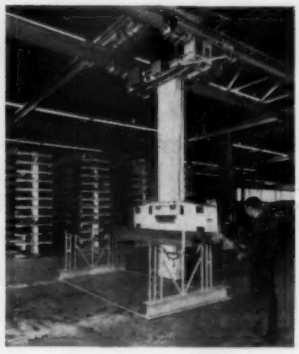
HOW'S THIS FOR STEEL STORAGE!

American MonoRail engineers, working with Hawkridge Brothers Company, designed this system for storing bars, rods and other long steel shapes.

Note the extremely narrow aisles and maximum height of racks. Bars and rods, 20-22 feet long, are placed in pans 18 feet long. The American MonoRail Stacker transfers these pans to either side of an aisle for storage.



MonoRail Stacker forks support bar in saw. Saw with extension rolls to any convenient spot in the warehouse.

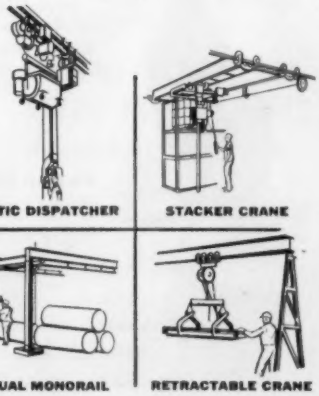


American MonoRail Stacker lowers a banded bundle of bars over prongs which ingeniously splits bands, lets bars roll into trough for pick-up in a tray.

Photos: Courtesy of Hawkridge Brothers Company, Waterbury, Conn.

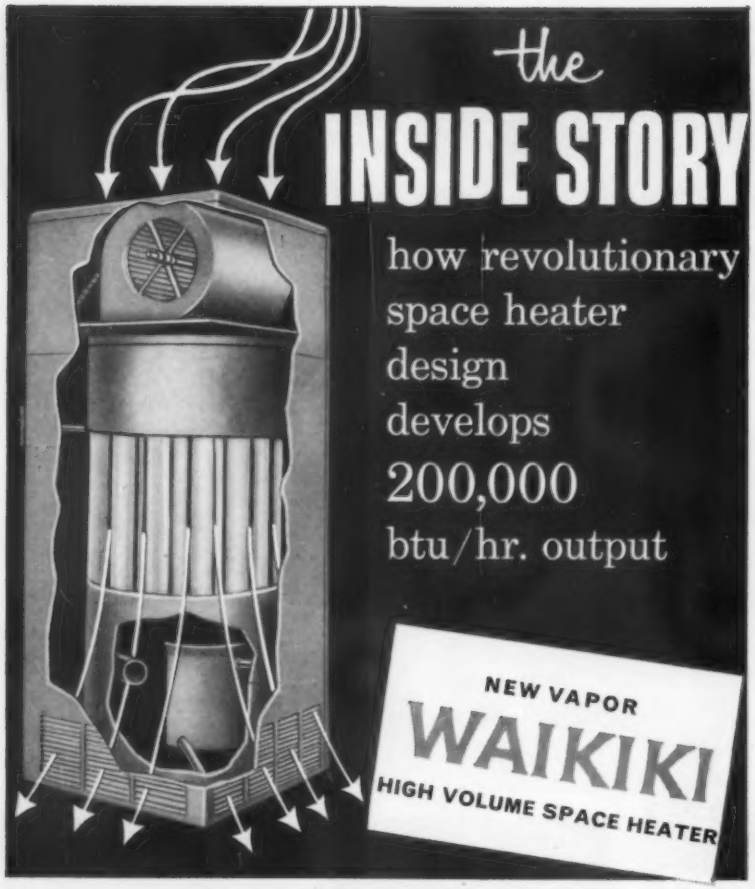
Member of Materials Handling Institute - MonoRail Association

AMERICAN
MONORAIL
COMPANY



13123 ATHENS AVENUE, CLEVELAND 7, OHIO (IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.)

For more facts circle 636 on Reply Card



Imagine—this compact 6½ ft. high, 30 in. square space heater produces enough heat to comfortize three 5-room homes! Extra-large heat transfer area (1 sq. ft. for each 3500 b.t.u. of rated output) and high volume *counterflow* air circulation does it. The result: abundant, uniform floor-to-ceiling, thermostatically controlled heat for "spot" or overall distribution—*when* and *where* you want it—with impressive fuel savings.

Installs vertically or horizontally on floor, shelf or balcony—for direct or duct distribution.

VOLUME HEAT WITH TOP ECONOMY

. . . for physical comfort in shops, warehouses, garages; for curing and drying; for thawing and defrosting; for pre-heating.

Burns Kerosene, Fuel Oils Nos. 1 and 2, Gas (Natural, Manufactured, L-P).

Send for Full Facts Today

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Please send New Waikiki Bulletin No. 445A.

Individual_____
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Company_____
Street_____
City, Zone, State_____

For more facts circle 637 on Reply Card

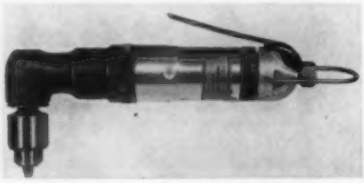
NEW PRODUCTS

(Begins on page 186)

of 30,000 psi. In the Shear-Seal principle of extreme pressure control incorporated, lapped optically flat metal-to-metal sealing surface of the sealing rings and mating rotor face always maintain intimate contact. Flow travels only through the center of the Shear-Seal, not across sealing surface. According to manufacturer, sealing qualities actually improve, as the self-aligning Shear-Seals lap themselves to a more perfect fit with each operation. This is said to mean no port-to-port leakage in detented positions over a long period without frequent overhauling. There is claimed to be no chance for external leakage because pressure is confined to flow passages. Barksdale Valves.

52—ANGLE AIR DRILL for drilling in close quarters

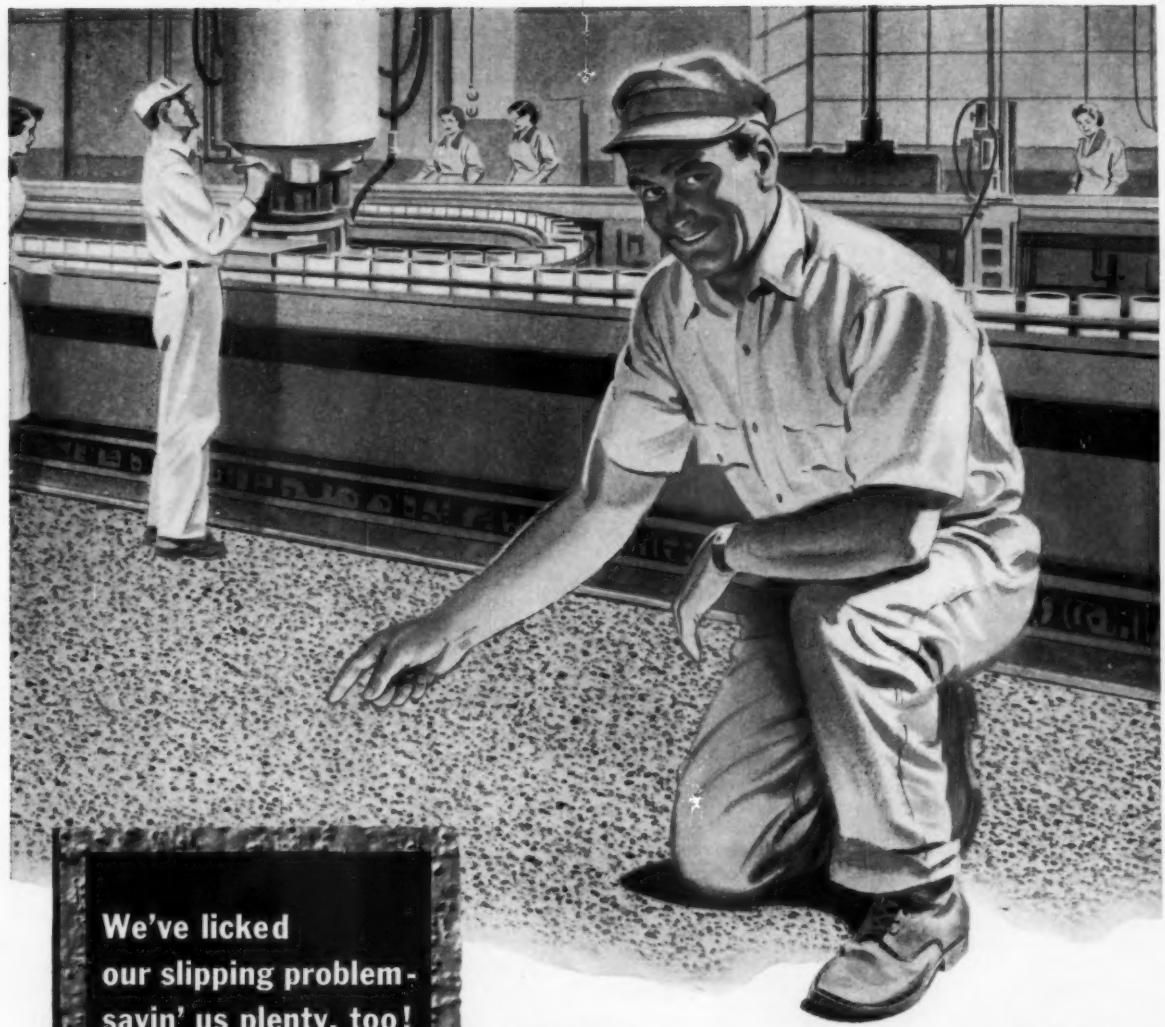
Tool 11G-2 is an angle air drill designed for use in close quarters and hard-to-reach places. Well-balanced for easy handling, it has a heavy-duty spiral bevel gear drive. The drill also



offers additional advantages of interchangeable gears, spindles and chucks which afford quick conversion to various jobs; one-shot lubrication with flush-type fitting; capacities up to 5/16 in. Powered by company's new air motor, unit has a complete torque and speed range—from 500 to 17,000 rpm. Company engineers point out that air intake and exhaust increase power, improve motor efficiency and muffle noise. Light weight is teamed with added power through a 1½-in. body diameter. Gardner-Denver Co.

53—PAINT PROCESS simplifies dip operations

The Harding Hot Dip Paint Process consists of preheating the article and then dipping it into paint which has been heated to approximately 160 F. The liquid contains a chlorinated hydrocarbon solvent (such as trichlorethylene). When the article is removed from the tank, this solvent is instantly evaporated from the paint by the heat radiating from the article, it is stated, and this results in quick



We've licked our slipping problem - savin' us plenty, too!

He's talking about ALGRIP—A.W. ALGRIP—the world's only abrasive rolled steel floor plate that provides super-safe footing under the *most hazardous* slipping conditions—on flat *or inclined* surfaces.

ALGRIP licks slipping and skidding hazards thoroughly by providing thousands of abrasive traction particles at every step. It's made by a patented process in which a grinding-wheel type of abrasive is rolled—*not coated*—to a controlled depth as an integral part of tough steel plate. Usage merely exposes more abrasive.

Look around for slipping hazards and make a test installation in your worst area. It'll save you plenty, too, as accident and insurance rates go down. Use it as an overlay or as independent flooring. ALGRIP fabricates easily and requires no maintenance.

ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

ALGRIP—*approved for safety by Underwriters' Laboratories*

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

Please send A.W. ALGRIP Booklet AL-S29

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

OTHER PRODUCTS:
A.W. SUPER-DIAMOND economy rolled steel floor plate—Plates—Hot and cold rolled sheet and strip—(Alloy and Special Grades)

For more facts circle 638 on Reply Card

NEW PRODUCTS

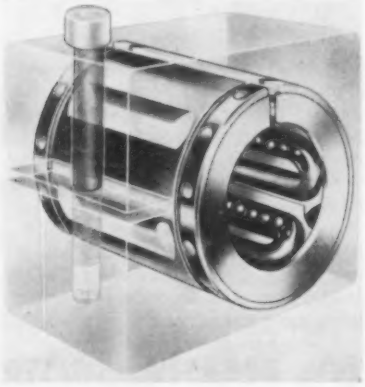
(Begins on page 186)

drying, uniform thickness and a drip-free coat. Also, the process is claimed to maintain control over thickness, being capable of applying coats from ¼ to 2 or more mils in one dip.

Several other advantages are cited for the process, including reduced equipment and installation costs through the elimination of cooling areas, drip pans, fire prevention apparatus and dump tanks. Also, it is pointed out that trichlorethylene is a non-flammable fluid, so that the fire hazard encountered in many paint processes does not exist. Manufacturer of the equipment also notes that previously chlorinated hydrocarbon solvents were impractical for paint dip operations in that they were difficult to recapture, while this process condenses the solvent so that substantially all of it is recaptured and may be diverted or returned to the solution. David-Ludwig Co.

54—LINEAR BALL BEARING with adjustable diameter

Designed for linear motion, these adjustable diameter ball bushings are split longitudinally and designed to provide line-to-line or slight preload fits when mounted in an adjustable diameter housing. Free-running no-play linear motion is said to be a simple matter, as the bearings enable

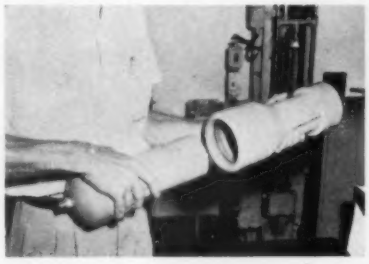


the tolerance on both shaft diameter and bearing bore to be adjusted out. In addition, the principle provides for compensation for wear that might eventually develop in severe applications. In some instances the bearings are used in a housing that is merely split and provided with an adjusting screw. Adjustable diameter bearings are available in standard sizes for shaft diameters ranging from 1 to 4 in. Thomson Industries, Inc.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 245-246.

55—QUICK COUPLING of high impact PVC pipe

Quick coupling that can be assembled and disassembled in seconds has been developed from high impact Koroseal polyvinyl chloride pipe, manufacturer announces. The coupling is suggested for temporary chemical, oil, water or disposal lines. To install, you merely push the grooved end of the pipe into



the coupling until the thrust ring seats in the groove, it is explained; to disassemble, you set a disassembly tool in place and pull the pipe out of the coupling. It is designed to take up to 10-deg misalignment in pipe joints. There are no exposed surfaces to protect, no metal parts, bolts or snaps. Quick coupling rigid pipe comes in 2-, 3- and 4-in. sizes in standard 20- and 30-ft lengths. B. F. Goodrich Industrial Products Co.

56—MIST SEPARATOR re-circulates the cleaned air

The Mistender is a mist collector which makes the usual dropper pipe serve not only as a connection between the source of the mist and the blower, but also function as the enclosure for the filter and pre-separator. This pipe-type collector, is for installation overhead, uses a slightly larger-than-usual pipe to enclose a filter especially adapted for separating mist from the air stream and returning it to the source as re-usable condensate. The pre-separator causes most of the mist as well as the solids to "throw out" and also be removed as condensate through contact with the pipe's inside surface. A considerable volume of solids, fog and mist is removed in this way, it is claimed, and never touches the filter.

To save heat the cleaned air is usually returned to the working space; an acoustically lined muffle serves to subdue air noise. However, exhaust to outdoors, when required because of

New 201LS1 "Plug-in Limit" with roller arm actuator

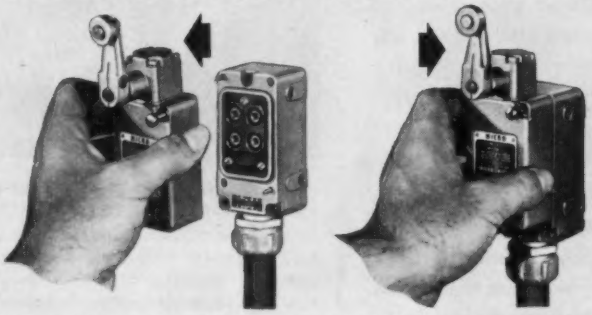
YOU CAN CHANGE THIS PRECISION LIMIT SWITCH IN SECONDS

This new MICRO SWITCH "Plug-in Limit" switch is designed for highly automatic production-line service. Wiring connections are made to a sealed terminal block which is permanently mounted on the machine. Once wired and mounted, the terminal block need never be removed. All moving parts—both mechanical and electrical—are contained in a separate switch enclosure which is plugged directly into the terminal block. Permanently attached dowel pins assure exact positioning. Since the actuating arm on the switch can be pre-set, the switch may be plugged in with no further adjustment. No re-wiring or re-mounting necessary. This means that you can change switches with no machine down time or other interruption of production.

MICRO SWITCH . . . FIRST IN PRECISION SWITCHING

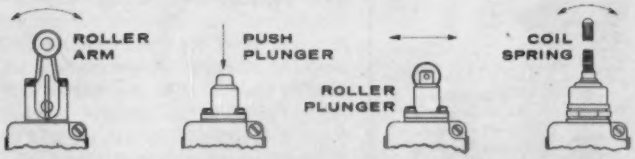
A sealed switch you can replace IN SECONDS! MICRO SWITCH "Plug-in Limit" (2-circuit switch)—cuts costly down time . . . no wiring . . . no mounting

Just PULL OUT and PLUG IN



You can change the new MICRO SWITCH "Plug-in Limit" switch in a matter of seconds—no re-wiring or re-mounting. Just loosen two captive screws, pull out the switch enclosure, plug in the replacement, and tighten the screws.

Actuators available to meet all requirements



Adjustments provide unusual versatility

1· Terminal block enclosure may be mounted on three surfaces and from four directions.

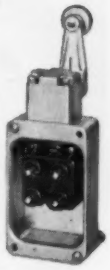
2· Roller-arm actuated switch may be adjusted to operate clockwise, counter-clockwise or both.

3· Operating head of the roller-arm actuated switch can be easily faced in any of four directions.

4· The roller arm is adjustable through 360° and can be positively locked at any position.

FOR COMPLETE DETAILS, SEND FOR BULLETIN NO. 20

PRECISION SNAP-ACTING BASIC SWITCH



The switch enclosure, contains all moving mechanical and electrical parts, including the plug-in unit. The spring plugs are integrally molded to the precision snap-acting switch body. Sturdy molded barriers protect plugs from damage.

RUGGED TERMINAL BLOCK

Wiring connections are made to a sealed terminal block enclosure which is permanently mounted on the machine. Under normal conditions the terminal block and its enclosure need never be removed from the machine.

ELECTRICAL CHARACTERISTICS

Contact Arrangement	10 Amp.	½ H.P.	1 H.P.	0.8 Amp.	0.4 Amp.	0.1 Amp.	Pilot Duty
2-circuit double-throw	120, 240 or 480 vac	120 vac	240 vac	115 vdc	230 vdc	550 vdc	660 vac max.

Meets NEMA Standards

The MICRO SWITCH completely sealed "Plug-in Limit" meets the requirements of NEMA Industrial Control Standards for non-ventilated enclosures of type IV-1C1-1.12 watertight and type V1-1C1-1.15 submersible.

For complete information on the MICRO SWITCH "Plug-in Limit" send for Bulletin 20 or call MICRO SWITCH Engineering Service at the branch office near you.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY

In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

For more facts circle 639 on Reply Card

SOLVE

WIRING PROBLEMS IN HOT LOCATIONS WITH TRIANGLE AVA CABLE

Triangle AVA Cable is a practical answer for all types of wiring in hot locations, particularly if oil, grease and corrosive fumes are a hazard. The insulation consists of a uniform wall of high dielectric strength varnished cambric sandwiched between two walls of glass reinforced asbestos impregnated with a chemically inert flame retarding, moisture resisting compound. An outer covering of glass reinforced asbestos braid, saturated and finished with flame and moisture resistant compounds, is applied over all.

AVA Cable can be pulled in conduit or can be installed as open wiring. It is recommended for power and lighting wiring in boiler rooms, steam tunnels, steel mills, soaking pits and other high temperature surroundings.

TRIANGLE CONDUIT & CABLE CO., INC.
New Brunswick, New Jersey

Write for bulletin AVA-10 describing Triangle Asbestos Varnished Cambric insulated cables.

Buy Smart — Buy from Your Distributor

TRIANGLE
"It MUST Be Right!"

For more facts circle 640 on Reply Card

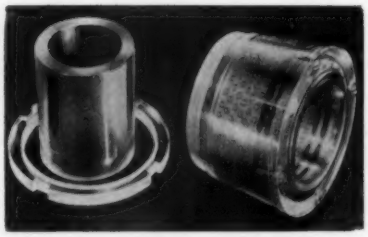
NEW PRODUCTS

(Begins on page 186)

noxious fumes, is by means of standard sheet metal pipe instead of the muffle —no adapters or enclosures being required. Filter changes are made from the floor. Lifting and turning the pipe serves to unlock and disconnect it, and the pipe may be removed or swung out to horizontal. Dustender Co.

57—ARBOR BEARINGS utilize new design principle

Basis for this standard line of arbor support bearings is a new anti-friction bearing design principle. As illustrated in the plastic model pictured, by utilizing many more balls than conventional



anti-friction bearings, the design provides greater bearing contact area, says manufacturer, and thus results in high load capacity. Also, a minimum of space is required to house the ball bearings, thus permitting a maximum inner diameter, as shown in the plastic model. Providing a wide range of arbor interchangeability, inexpensive, easy-to-use arbor bearing collars are announced as available for each standard bearing. Seated within the arbor support housing, the bearing does not project into the work area, it is pointed out, and there's no interference with work and fixture. Arbor chatter and binding are said to be minimized, making it possible to increase machine feeds and speeds. Bearings come in the 12 standard sizes. Briney Mfg. Co.

58—PURIFIERS designed to take high pressures

These new additions to company's line of Hi-eF Purifiers are designed to withstand pressures up to 15,000 psi for steam, air and process vapor and gas lines. They are primarily for high pressure applications in chemical, petroleum, synthesis gas, petrochemical, air reduction plants. Pressure parts are a special alloy steel with special gaskets and pipeline connections. To date the largest of these new pressure vessels is a 6-in. size, while 12,050 psig is the maximum service pressure announced. Manufacturer states that the unit uses no moving

(Begins on page 186)

parts, filter or mesh screens, but operates by a two-stage principle of separation that employs controlled centrifugal force to guide the entrainment-laden vapor through vanes and baffles. The V. D. Anderson Co.

59—LOAD-BREAK EQUIPMENT rolls out of enclosure

Switch and fuse equipment that disengages and rolls outs of its enclosure for ready servicing—yet offers maximum safety for personnel, plant and equipment—is announced. According to company, the load-break equipment —consisting of an interrupter switch and current limiting fuses—is capable of interrupting full load current on circuits where unit is applied. Continuous current rating of switch is 600 amp from 2.4 to 13.8 kv. Switch and fuse combination offers provisions for both normal switching and fault protection on circuits with available short circuit currents up to 60,000 rms asymmetrical amperes. To provide better closing against its full momentary rating, switch is equipped with a stored energy closing mechanism. Springs are charged with a ratchet mechanism, and discharged from a handle at front of equipment. For indoor or outdoor applications, equipment can be furnished for single or multiple installation. General Electric Co.

60—CONVERTER fills fire extinguishers with dry ice

For use in plants maintaining their own fire extinguishers, this vertical 150-lb capacity converter is loaded from the top at chest height for most men. The full-opening cover is swivelled around on its hanger, eliminating lifting by operator; it spins open or closed on big acme-type threads. Three full-sized 50-lb cakes of dry ice may be dropped into the converter without breaking or extra handling, says man-

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ALL TRIANGLE PRODUCTS LOCALLY FROM YOUR ELECTRICAL DISTRIBUTOR

It's smart today to buy all your electrical needs — wire, conduit, cable, switches, fittings — from your nearby distributor. One call shopping saves you time and money.

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Your Distributor— The Best Friend Your Business Can Have!
TRIANGLE CONDUIT & CABLE CO., INC
New Brunswick, N. J.
TRIANGLE
"It MUST Be Right!"

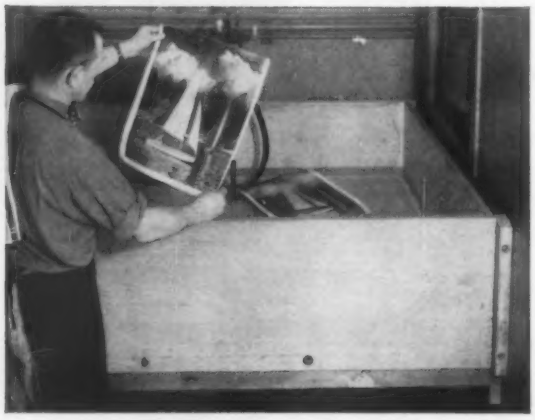
For more facts circle 641 on Reply Card

SMOOTH

Smooth and glossy surface of high-density overlaid fir plywood makes it an ideal choice for work-table tops. Overlay is a fused resin-fiber, impervious to water and most chemicals—dense and hard, free of grain. High-density overlay can be painted, but is most often used with no finish of any kind.

DURABLE

Fir plywood, constantly subjected to 200° F. steam heat, proved highly successful in this tobacco stem drier. Constructed of ¾" Exterior-type (EXT-DFPA) plywood, the unit was given no finish on the inside and only a shellac finish on the outside. Exterior plywood glue-line withstands water, weather, extremes of temperature.



VERSATILE

Developing tanks in a photo-offset plant demonstrate the versatility of Exterior-type fir plywood. Virtually every kind of maintenance or materials handling problem can be solved with plywood. It is easy to handle, easy to work with ordinary hand or power tools . . . real wood, engineered for strength and durability.

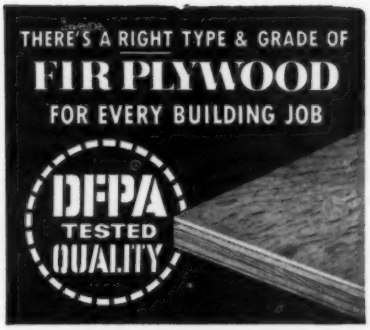
DFPA TESTED QUALITY

FIR PLYWOOD

means quality construction

FOR MORE INFORMATION about uses shown above, design and/or specification data, mail coupon ⟶

For more facts circle 642 on Reply Card



1. SPECIFY BY DFPA QUALITY TRADEMARKS

DFPA grade-trademarks appear only on plywood manufactured, inspected and scientifically tested under the DFPA quality control program. DFPA, Douglas Fir Plywood Association, is a non-profit industry organization devoted to product research, promotion and quality maintenance.

2. CHOOSE THE RIGHT GRADE FOR EACH JOB

Fir plywood comes in two types: 1. *Exterior* (waterproof glue for permanent exposure to water or weather); 2. *Interior* (moisture-resistant glue) for indoor uses, crating, sheathing, maintenance. Within each type are several grades – i.e., panels with one good side, two good sides. Most popular grades are shown below.

EXT-DFPA — Exterior plywood for permanent outdoor uses

PlyPanel® for paneling, most indoor uses

PlyScord® is unsanded panel for sheathing, crating, bins, etc.

PlyForm® concrete form grades come in Exterior and Interior types.

SPECIALTY PANELS include 1. *Overlaid Exterior plywood* (hard, smooth, abrasion-resistant fused resin-fiber surfaces) for siding, signs, tanks, concrete forms; 2. *Textured panels* with smart grooved, brushed or striated surfaces for fixtures, siding, special decorative effects.

DOUGLAS FIR PLYWOOD ASSOCIATION
Tacoma 2, Wash. (Good USA Only) Dept. 180
☐ Please send basic fir plywood specification data.
☐ Also send information about use of fir plywood for.....
Name.....
Firm.....
Address.....
City..... Zone..... State.....

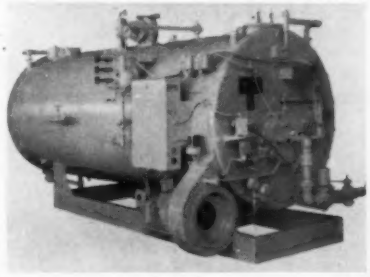
NEW PRODUCTS

(Begins on page 186)

ufacturer. No power or refrigeration is required with this converter. The Dry Ice Converter Corp.

61—PACKAGE BOILER is compact and economical

Announced as low in price, the Model R is compactly designed to save floor space and operating space. Despite design improvements, the Model R is essentially the same as company's earlier Models X and Y. This efficient pressure vessel remains the same, says manufacturer; the three-pass



concentric tube design is retained, permitting use of a one-piece rear baffle and one-piece fuel cover, both swung on davit hinges for easy access. Also retained are plastic refractories. Relocation of auxiliaries and controls simplifies operation. Necessary components are centrally located and the simple wiring pattern retained. Relocation of fuel pump eliminates need for booster pumps to overcome resistance of long runs of suction piping. A simplified oil pre-heating system is incorporated.

At present this generator is offered in sizes from 10 to 150 hp for pressure to 250 psig, for oil, gas or combination oil-gas firing equipment. Quick fuel switchover is available. Ames Iron Works, Inc.

62—LEVEL CONTROL designed for more rugged service

Engineering changes in the Roto-Bin-Dicator are said to permit use of this equipment where severe, or rugged operating conditions exist, such as vibration and high stresses on paddle and shaft assembly. Available in standard and explosion-proof models, this bulk material level control device is suggested for bins under pressure or vacuum; bins, chutes or conveyors handling lumpy materials which tend to "bridge" over a diaphragm; and bins holding materials which tend to "rat-hole." To circumvent these problems, the Roto-Bin-Dicator has a slowly rotating paddle, mounted on a flexible shaft. This projects into the bin and is driven by a small motor in a housing outside the bin. When material in the bin covers the paddle its rotation is stopped and the torque exerted by the motor actuates a Micro-Switch in the motor housing. When material drops below the paddle, rotation is resumed and the switch returns to normal position. The shaft flexes as required under impact or thrust of material and does not take on permanent distortion, manufacturer explains, and being flexible it sheds top loads. The improved Roto-Bin-Dicator has a re-designed low torque motor and gear reduction unit. Bulletin 8C gives details. Bin-Dicator Co.

63—MAGNETIC DISC BRAKE for hazardous locations

Style UH 70 Series offers units rated at 10, 15, 25, 35, 50; and 75 lb-ft maximum torque with UL approval for Class I Group D hazardous locations. The series is described as shorter, lighter, and more easily mounted than its predecessor. Featured are single solenoid construction, easy assembly and disassembly for maintenance purposes, single point adjustment for lining wear, and a visual indication of condition of friction linings in respect to lining wear. The series is provided with a NEMA C bolt circle and register suitable for mounting on rerated motor frames 213 through 286 U. At the present time only an alternating current model is available. Specification Sheet 3202 gives details. Stearns Electric Corp.

64—DOCK BUMPERS are rugged, low in cost

Redesigned Kelco Dock Bumpers are molded of live rubber and claimed to have superior shock absorbing and

cushioning capacity. In quantities up to ten they cost around $14.00 each; the price is less for larger quantities. Manufacturer says these bumpers are easily and permanently mounted on new or existing docks. Kelley Co., Inc.

Take a load off the operator's mind with Coles "no-over-the-head" handling

Coles cantilever boom does not permit the load to pass over the operator's head. Short wheel base and short tail swing allows entire cab to revolve with load and still provide close-quarter handling.

COLES
CRANES
JOLIET 10, ILLINOIS

WRITE FOR BOOKLET "101 Cost-Cutting Ways"

Now, available L. P. G.-, diesel-, or gasoline-electric powered in capacities from 5 to 50 tons. Available on long term lease arrangements.

For more facts circle 643 on Reply Card

Care of Rubber Rolls

(Continued from page 119)

the roll diameter, combined surface-speed of roll and wheel, and hardness of the roll.

In the final analysis, much depends on the skill of the operator and his feeling for the job. He must avoid burning the rubber and loading the grinding wheel.

Finishing cuts should be made after the rough grinding passes have been completed, and the new surface should be formed below the depth of oxidation, hairline cracks, or surface damage. This depth should be 0.002 in. to 0.004 in. for best results; the last two or three passes of the wheel with no feed at all. If extra smoothness is desired, finish at high speed with 100- or 150-grit abrasive paper.

Regrinding of crowned rolls is rarely practical in the user's own shop as this requires a precision grinding machine with a special crowning attachment. Such rolls should be returned to the roll-maker for refinishing by expert workmen. Listed in Table II are the specifications and manufacturers of several good, grinding wheels. **End**

Engine Analyzer

(Continued from page 116)

ed out, can use the analyzer competently after a few hours' instruction.

The system will detect and analyze a wide range of maladjustments and malfunctions before they develop into serious problems. For example, it will detect within one degree of crankshaft position any ignition mistiming.

The industrial engine analyzer operates in this manner: A sweep is driven across the cathode ray tube in time with the engine. The resulting trace line shown on the screen is responsive in the vertical direction to signals from ignition, cylinder vibration and cylinder pressure. Simple manipulation of the controls presents a precise and complete picture of the engine's operation.

Four quickly-made connections to the engine are required. They are made to the flywheel, ignition primary circuit, and two to a power cylinder. Timing the analyzer to the engine is accomplished by a fifth pickup located near a mark on the flywheel. All the connections may be made without stopping the engine. **End**

For more facts circle 644 on Reply Card →

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A DIVISION OF THE FLUOR CORPORATION, LTD.

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Hartmann Pneumatic and Mechanical Conveying Systems, Ash Handling Systems, Dust Removal and Classifying Systems

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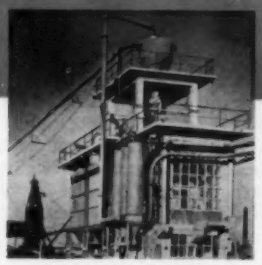
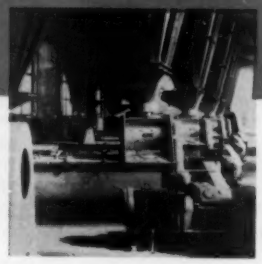
Over 50 Years' Design Experience in a Wide Variety of Industrial Applications...



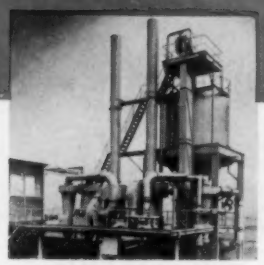
PNEUMATIC CONVEYING

Hartmann has designed, fabricated and installed over 1000 systems for more than 200 different industrial applications. The first, in 1903.



MECHANICAL CONVEYING

In belt, screw, chain, plate and bucket types — experienced in standard and special applications and in combination with pneumatic systems.



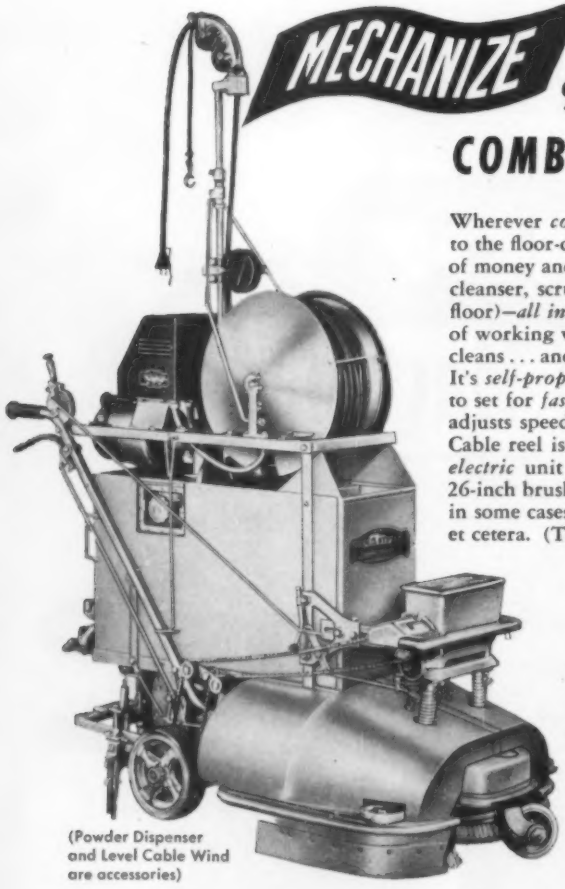
DUST REMOVAL SYSTEMS

Fluor-Hartmann designs wet or dry types or combinations of both for critical industrial applications ranging from de-dusting to air sifting.

Sales Offices in:
Birmingham, Buffalo, Chicago, Denver, Detroit, Houston, Kansas City, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, San Francisco, Tulsa, Toronto, Ontario

Let's not clean away dollars and man-hours with costly, inadequate floor care

MECHANIZE *your floor-cleaning with a* COMBINATION SCRUBBER-VAC!



(Powder Dispenser and Level Cable Wind are accessories)

Wherever *combination-machine-scrubbing* is the practical solution to the floor-cleaning problem, any lesser, slower method is wasteful of money and manpower. A *Combination Scrubber-Vac* applies the cleanser, scrubs, flushes if required, and picks up (damp-dries the floor)—*all in one operation!* Maintenance men like the convenience of working with this single unit . . . the thoroughness with which it cleans . . . and the features that make the machine simple to operate. It's *self-propelled,* and has a *positive* clutch. There are no switches to set for *fast* or *slow* — slight pressure of the hand on clutch lever adjusts speed to desired rate. The powerful vac performs quietly. Cable reel is self-winding. *Finnell's 213P Scrubber-Vac* at left, an *electric* unit for heavy duty scrubbing of large-area floors, has a 26-inch brush spread. Cleans up to 8,750 sq. ft. per hour (and more in some cases), depending upon condition of the floors, congestion, et cetera. (The machine can be leased or purchased.)

Finnell makes *Scrubber-Vac Machines* in a full range of sizes, and *gasoline* or *propane-powered* as well as *electric* models. From this complete line, you can choose the size and model that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that *a Finnell Floor Specialist and Engineer is nearby* to help train your maintenance operators in the proper use of the machine . . . to recommend cleaning schedules for most effectual care . . . and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 5311 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

For more facts circle 645 on Reply Card

Up-Date Insulation Specs

(Continued from page 107)

through-joint openings from metal to air and resulting heat losses. In addition, the through openings may damage canvas jackets.

In the cases of long runs of ducts or flues and with large tanks and vessels at elevated temperatures, it may become necessary to install expansion joints as well as to use double layer insulation. These are usually provided at 12- to 18-ft intervals. While there are numerous methods of constructing expansion joints, the basic technique usually allows a space of an inch or two between insulation blocks or sections at desired intervals. These voids are packed tightly with fibrous insulation. A sliding shield or collar is secured over the joint.

Economical Thickness

These are a few of the problems in insulation on higher temperature equipment. The calculation of economical thickness is another of increasing importance. In some cases where lower temperatures prevailed and fuel conservation seemed less vital, it was the practice to specify "pipe covering of standard thick insulation." Aside from the fact that so-called "standard" thickness had no relationship to the fuel saving or economic objectives, this now obsolete thickness designation may have been too little or too much.

Standard and double standard insulation thicknesses are no longer produced and the terms have been dropped. For 85 per cent Magnesia, calcium silicate, expanded silica and diatomaceous silica, members of The Magnesia Insulation Manufacturers Association have adopted new simplified thicknesses. These are expressed in nominal half-inch increments for record purposes and the actual thicknesses need only be employed for critical engineering calculations. The sizes and thicknesses are such that they can be used over pipe or over another smaller insulation section as double layer.

In specifying insulation thickness for fuel economy, the calculation should be based on the lowest cost figure represented by the sum of the annual heat loss and the annual applied cost of insulation. Any insulation engineer can calculate this when the factors are known. End

How molten metal helps give Galbestos its superiority

Robertson Color Galbestos has the greatest resistance to weather and corrosion of any protected steel roofing or siding obtainable anywhere. This position of broad superiority is made possible by a unique manufacturing process exclusive with H. H. Robertson Company.

First, the steel sheet is pickled . . . then given a coating of molten zinc. Asbestos felt is then pressed on so that as the molten metal hardens in cooling it grips the felt fibers in absolute bond. The asbestos is then impregnated with a special asphaltic compound and, finally, given a tough weatherproof coating. Galbestos can be furnished flat or in the 3 well-known corrugations: Standard, Mansard, and V-Beam. The resultant material is so durable, it may be sheared, bent, rolled, crimped and riveted in the field as easily as ordinary unprotected steel. It will withstand the greatest possible extremes in weather temperatures without deterioration, and will actually retard fire better than naked steel. For an industrial roofing or siding that requires no maintenance under the most severe corrosive conditions, specify Color Galbestos.

Long Service Life. Color Galbestos will give longer maintenance-free service under the most severe weather and man-made corrosive conditions. Even salt air cannot penetrate its tough coatings to destroy the steel core.

Not Fragile. Color Galbestos' strong steel core sheet guarantees against breakage—during shipment or during erection.

Resists Climatic Extremes. Color Galbestos is not subject to damage either by tropic or frigid temperatures. Its coatings will not run under broiling sun or crack or spall in sub-zero weather.

Goes Up Fast. The exclusive Robertson Top-Speed method of attaching Color Galbestos to structural steel speeds up erection for quicker occupancy.

Resists Flame. Leading testing laboratories have made exhaustive tests on the fire resistance of Galbestos and have published the results. Copies of these reports are available for study.

NOW AVAILABLE IN SIX USEFUL COLORS FOR ROOFS AND SIDEWALLS

Robertson Color Galbestos

a product of H. H. Robertson Company
2419 Farmers Bank Building · Pittsburgh 22, Pa.
In Canada: Robertson-Irwin Ltd., Hamilton, Ontario
In England: Robertson Thain Ltd., Ellesmere Port, Cheshire

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they're not just painting—they're
CORROSION-PROOFING!

When you put on a coat of aluminum paint, you're putting on a tough, corrosion-and-rust-resisting *shield*—a shield that saves plenty on maintenance. You paint on protection with a coat of aluminum paint, even in the most corrosive spots.

A quality brand of aluminum paint applied as the manufacturer recommends assures extra years of protective service. Often just one coat will do the job.

Aluminum paint can be an important cost-cutter for your plant in other ways, too. It reflects heat and light to keep your plant cooler in summer; it slows down evaporation of volatiles; it reduces metal expansion due to heat. And aluminum paint, the modern finish, keeps your plant looking new.

For more complete information send in coupon below.

A Coat of Aluminum on Your Roof Means Lower Maintenance

The easy way to give your plant a better roof, one that will need less attention, is to coat it with an asphalt-aluminum roof paint or coating. It will last years longer, and keep buildings cooler in summer. This Warranty Seal on asphalt-aluminum roof coatings means the finest—it assures an approved vehicle and at least two pounds of pure aluminum pigment in every gallon. If you employ a contractor, be sure he's reliable, and ask him to use roof paints and coatings with the Warranty Seal.

By the makers of Reynolds Wrap

The Finest Paints Made with Aluminum are made with REYNOLDS ALUMINUM PIGMENT

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Watch Reynolds All-Family Television Program "DISNEYLAND", ABC-TV

For more facts circle 647 on Reply Card

Plant-Engineered Line

(Continued from page 105)

ping during subsequent handling. This fold is finally covered by the heater jacket top.

To further speed the work, a special table was designed for unrolling and exposing the insulating blankets as they are needed. See Fig. 2. The roll of pre-cut blankets with their paper backing is mounted at one end of the table. Next, the paper backing material is threaded across the table and onto the paper take-up roll. When blankets are needed, the paper take-up roll is actuated by a switch. This unrolls the supply roll along with the enclosed, pre-cut blankets.

When two of the side-by-side blankets have thus been unrolled onto the table top, a limit Microswitch stops the take-up roll. Two blankets are thus exposed and ready for draping over a heater tank. In effect, this table keeps a ready supply of pre-cut insulating blankets on hand at all times, with the only effort expended being that to trip the switch that starts the take-up roll when more blankets are needed.

Packaging Machine Developed

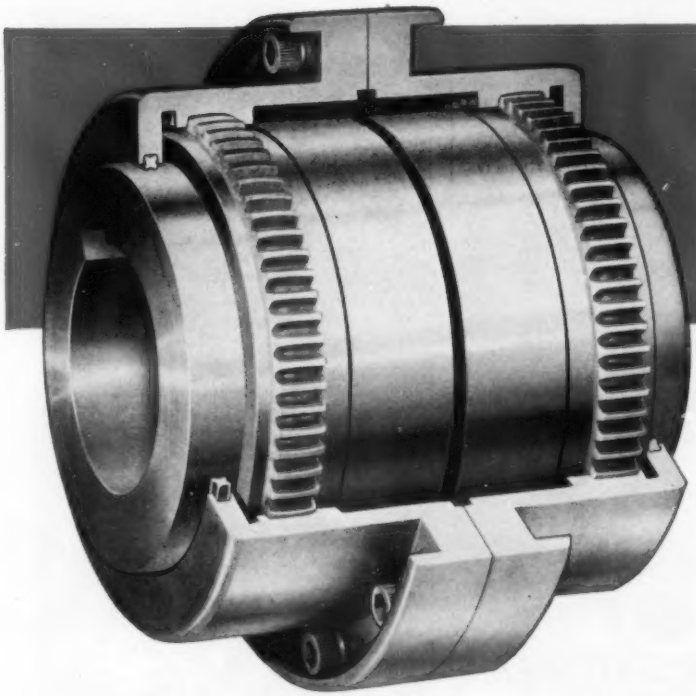
Owens-Corning engineers cooperated also in developing the special packaging machine now in use. With this setup, one operator can package a water heater and have it ready for shipment every 30 seconds. Corrugated cardboard cartons or "tubes" are used. The flaps that close the top of the carton are hand-stapled. The flaps that close the bottom are automatically folded and glued.

When the water heater legs are attached during the final assembly, a reinforcement carton bottom is put in place. The heater moves along on this bottom section until it reaches the packaging machine. It arrives at the packaging station on a roller conveyor, and stops directly before the packaging operator.

The operator first touches a foot lever with his toe. Upper left, Fig. 3. This causes two, short, cam-controlled sections of the roller conveyor to drop downward and open outward from the heater bottom, providing room for the crosswise flaps of the carton as it is slipped downward over the heater. The carton flaps that run horizontal to the direction of conveyor move-

Why LINK-BELT geared flexible couplings can

transmit more hp per coupling dollar



Size for size, they accommodate larger shafts . . . transmit more power than other comparable couplings

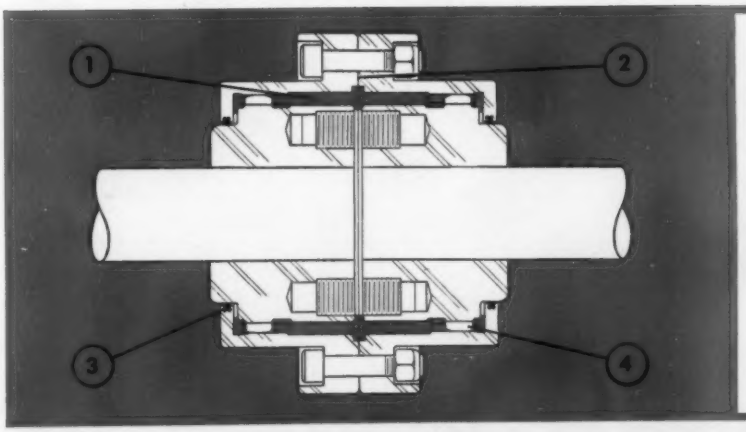
LINK-BELT geared flexible couplings offer an ideal combination of compactness, performance and low cost. They're designed for high load capacity, yet cost less because they are smaller.

Hardened steel socket head flange bolts —ground for close fit—are the key to compactness. They permit a smaller flange. Thus, more of the coupling diameter is devoted to the gear and a larger hub which can be bored to accommodate larger shafts.

In a great variety of coupling applications—including those where shock, vibration, reversing loads and misalignment are encountered—these couplings can be used effectively to assure long life and minimum maintenance. Popular sizes are available with finished bores, packaged and ready for installation. For complete details, contact your nearby Link-Belt office or authorized stock-carrying distributor. Or write for your copy of Folder 2775.

LINK-BELT

GEARED FLEXIBLE COUPLINGS



2-piece housing design assures efficient sealing and lubrication

1. In operation, the lubricant centrifuges to the working gear surfaces at the perimeter of inside cavity.
2. Fiber gasket fits tightly between flanges. Lubricant can't escape.
3. Hub seal is smaller in diameter than gear teeth and running level of lubricant. No leakage is possible—dirt and water stay out.
4. Mating gear teeth are constantly lubricated, preventing wear and providing long, trouble-free operation.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville (Sydney), N.S.W.; South Africa, Springs. Representatives Throughout the World. 14.494

For more facts circle 648 on Reply Card

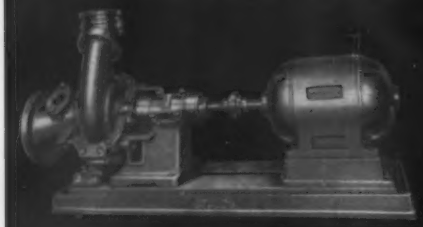
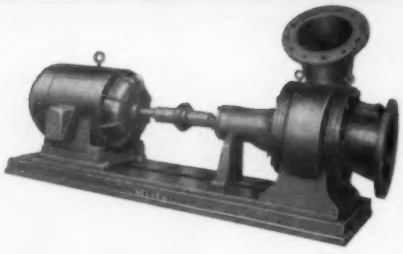


Fig. 3135 single-stage paper stock pump. Centerline discharge and self-venting casing provide steady flow without binding. Non-clogging impeller with back wall ejector vanes. Handles slurries. Twelve sizes; capacities to 6400 GPM, heads to 215 ft.

Fig. 3138-39. Specially designed for heavy duty service, pumping corrosive or noncorrosive liquids, with or without solids in suspension. Vertically split casing, "back pull-out" design. Four sizes; capacities to 9000 GPM, heads to 160 ft.



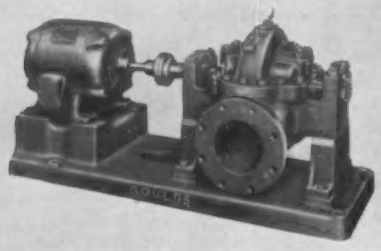


Fig. 3405 single-stage, double-suction pump. All sizes and pump combinations based on only 3 shaft and bearing assemblies. Mechanical seals or stuffing boxes. Rotation can be changed in field. Thirty-three sizes; capacities to 6400 GPM, heads to 425 ft.

GET QUICK ANSWERS TO CORROSIVE PUMPING PROBLEMS

You can solve corrosive pumping problems quickly because a number of Goulds centrifugal pumps now come in a wide range of special metals.

You can get them with fluid ends in your choice of the special metals listed below. Just match the special metal to your pumping problem.

All Bronze
Type 2 Ni-Resist
All Iron
Bronze Fitted
Nickel Aluminum Bronze
Steel and Steel Alloys

What's more, you'll get prompt delivery on these pumps (or any of four other types) in corrosion-resistant constructions from Goulds foundries.

You can keep spare parts inventory low, and meet quick changes in process requirements because Goulds pumps are designed with standardized parts for easy interchange between sizes.

Bulletin 5252-J has brief descriptions of these pumps (and the Goulds-Pfaudler *glassed* pump). Write for a copy.

GOULDS

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NEW YORK CITY, Room 1503, 11 Park Place
PHILADELPHIA, 2099 North 63rd St.
PITTSBURGH, Room 512 Bessemer Bldg., 104-6th St.
TULSA, 543 East Apache St., P. O. Box 6157

West Coast Representative: GOULDS PUMPS Western, Inc., 1919 N.W. Thurman St., Portland 9, Oregon
In Canada: The A. R. Williams Machinery Co., Ltd.... in all principal cities

For more facts circle 649 on Reply Card

Plant-Engineered Line

(Continued from page 232)

ment are caught on folding bars and folded backward and up.

When the carton tube has been slipped down over the heater, Fig. 4, the operator closes the upper flaps and staples them with a stapling gun suspended conveniently at hand. At the same time he touches another lever with his toe which causes the cam-controlled conveyor sections to move back into place.

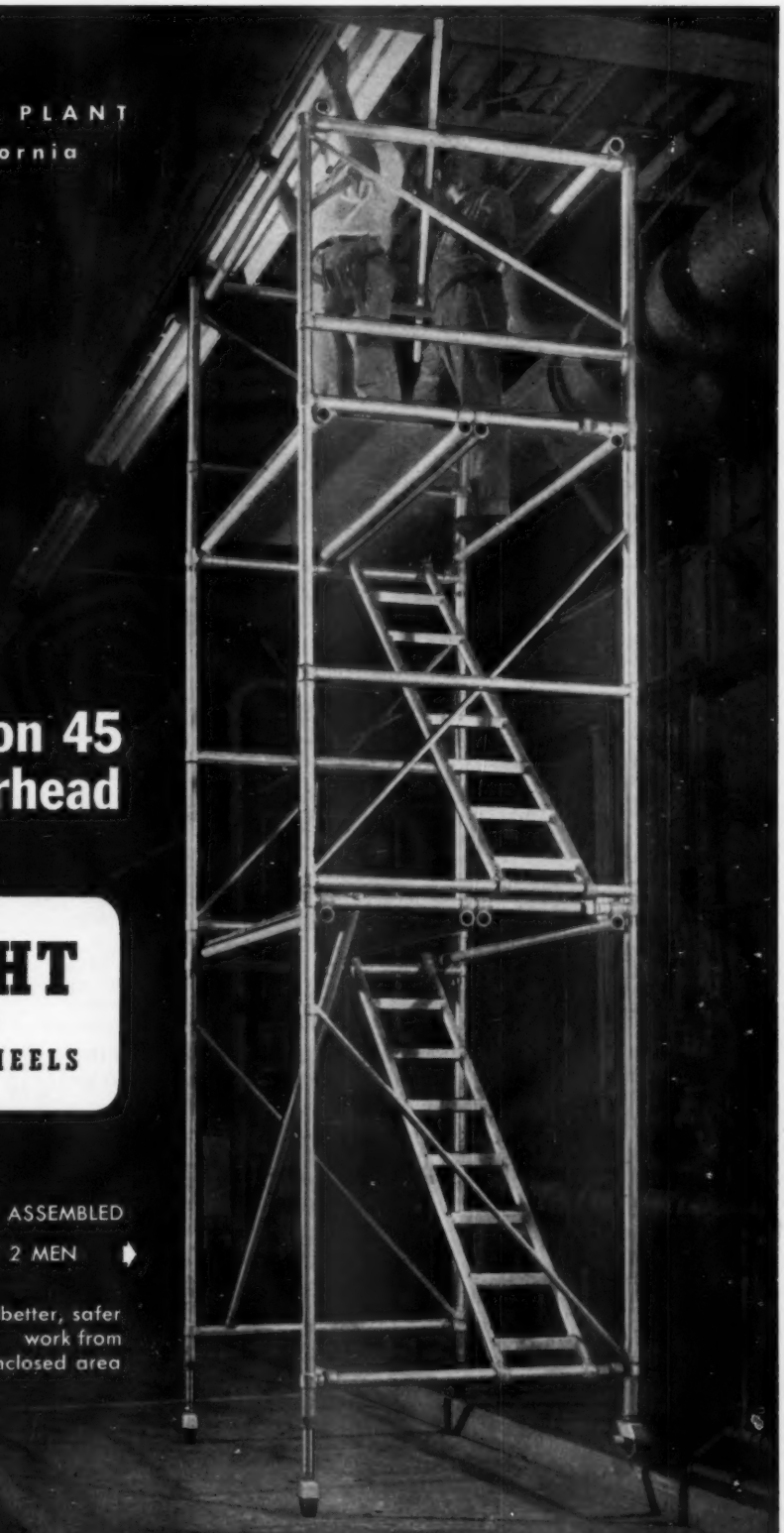
In doing so, they fold the two crosswise flaps of the carton into place. The operator then gives the partially cartoned heater an easy shove which sends it onto a narrow belt conveyor, Fig. 5. This belt is narrow enough so the horizontal flaps can be folded inward against the carton bottom without interference. As the heater moves forward,

folding bars engage these horizontal flaps and bend them downward against glue rollers.

Beyond the glue rollers, another set of inclined folding bars fold the flaps upward against the carton bottom. At this point, the cartoned heater moves onto a short section of triple belt conveyor, with the two outside belts holding the glue flaps firmly in place until the glue has set. This requires about 30 seconds. Then, the cartoned heater is conveyed to the shipping department.

The foresight and ingenuity of Mission Appliance Corporation plant engineers (and Owens-Corning Corporation engineers) in designing and building this equipment makes it possible to accomplish far more and better results in the same amount of floor space and without adding personnel. **End**

FORD ASSEMBLY PLANT
San Jose, California



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IN 2 MINUTES BY 2 MEN

Faster, better, safer
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large enclosed area

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You, too, can save with these rapidly assembled Up-Right aluminum scaffolds

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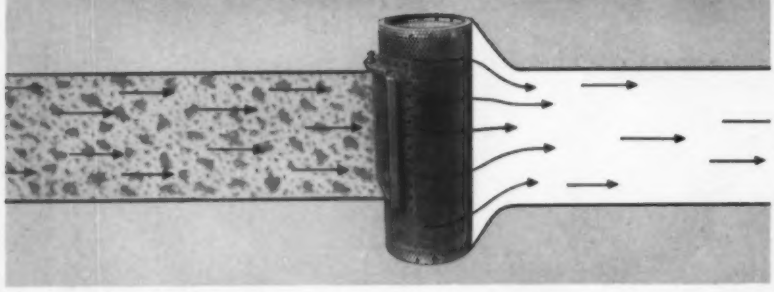
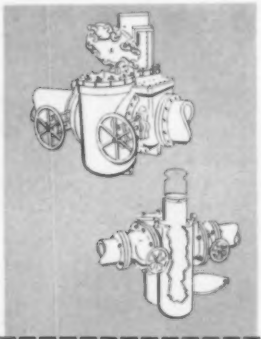
ELLIOTT STRAINERS

assure "trouble-free" clean liquids



For over 50 years, Elliott strainers have proved themselves in power and industrial plants everywhere. Removing objectionable solids that could cost thousands of dollars in lost time and damaged equipment, they keep liquids clean and free of foreign matter.

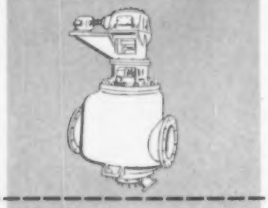


ELLIOTT TWIN STRAINERS
TYPE A, for water and other liquids

Provides continuous flow, since one strainer basket is in service while the other is removed and cleaned. Available sizes 4" to 24" for 125 psi, and 4" to 12" for 250 psi pressure. Straining-basket mesh ranges from 1/32" to 3/8". Also available: back-flushing strainers in manually-operated and rotary spray types, sizes 4" to 24".

TYPE V, for lube oil, fuel oil, viscous liquids

Uses large-size baskets to facilitate unrestricted fluid straining. Sizes from 1" to 8" for 125 psi, 1 1/2" to 10" for 300 or 500 psi, straining perforations from 3/8" down to fine wire mesh.



TYPE K SELF-CLEANING STRAINER
for removing large amounts of foreign matter in water

Cleans itself automatically and continuously by back-flushing the straining units. Standard sizes 4" to 24", pressures 25 to 125 psi, straining units 1/32" to 3/8" mesh. Available with AC or DC motor, low power requirement.

TYPE F SINGLE STRAINER
where flow can be interrupted for cleaning

Excellent for liquids not containing large amounts of foreign matter, or batch processes. Quick-opening cover. Sizes 2" to 24" for pressures up to 125 psi, basket mesh 1/32" to 3/8".

For further details, call your nearby Elliott District Office or write Elliott Company, Accessories Department, Jeannette, Pa.

A7-3

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STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

For more facts circle 651 on Reply Card

"Paper" Cafeteria

(Continued from page 103)

The menu pattern is as follows: soup, one or two hot casserole dishes, a variety of sandwiches, of main-dish and side salads, and a selection of desserts, beverages.

The equipment necessary for this menu includes the following: a rack for portion-packs of canned soups and two plug-in hot cups, as well as a table; a hot-plate for the home-made soup; a refrigerated display unit for salads and desserts, with shelves above for sandwiches, breads and pastry, a refrigerated sandwich-making unit for those who want their sandwiches "custom-made," and coffee urns, and creamer, a reach-in refrigerator, a manual soft drink dispenser and a 3-selection vending machine; an oven for heating casserole dishes, and a display warming oven for keeping them warm, merchandising and serving them; a two-sink unit; a cash register and two cabinets for paper goods.

This equipment has been engineered into a compact unit that saves space, permits fast traffic. It requires, during the lunch hour, the service of two persons to serve 600 people. The unit is designed in a "U," in such a way that patrons can use both the "inside" of the "U" and the "outside" for self-service, thus forming two lines, handled by a single cashier. The other person makes the made-to-order sandwiches. Everything else is self-service, including coffee and other beverages which are drawn by Donnelley employees from coffee urns and other dispensers. Employees also open their own cans of soup, and heat them and "bus" their soiled tableware to the nearest trash can.

Paper plates make this operation possible. They serve main-dish and side salads, are used under casserole entrees, for desserts and pastry, bread and butter and sandwiches. They save the initial investment of several thousand dollars of dish-washing equipment, the need for at least 120 sq ft of space, the maintenance, hot water, supplies and several hours of employee labor a day for even minimum dishwashing. In addition, since this cafeteria adjoins offices, and was installed after the building was built, they eliminate

Edward M. Deasy
ASSISTANT PLANT MANAGER
Thiokol Chemical Corporation
Trenton, New Jersey

"Doc, dermatitis control is simple as 1-2-3-4-5."

An exaggeration?

Not at all. Occupational skin irritation can be prevented. Simply. At surprisingly little cost.

— with the WEST Dermatitis Prevention and Control Program that:

1—insures personal cleanliness
2—protects exposed skin areas
3—prevents clothing contamination
4—guards against special hazards
5—provides continuous consultation.

THE WEST Program is based on individual shop requirements. It can save hundreds, perhaps thousands, of dollars each year by eliminating medical treatment, enforced idleness, lowered morale, production lags.

"We controlled dermatitis with West's Program"

"Dermatitis no longer troubles our plant employees – now that we're using West's Program of Prevention and Control," says EDWARD M. DEASY, Assistant Plant Manager, Thiokol Chemical Corporation, Trenton, New Jersey.

"At the suggestion of the West Representative, our program includes LAN-O-KLEEN Hand Cleaner to insure personal cleanliness and ANTISEPTIC PROTECTIVE CREAMS to protect exposed skin areas. Since these products have been in use, outbreaks of skin irritations have ceased altogether."

Would similar results interest you? Send the coupon.

LARGEST COMPANY OF ITS KIND IN THE WORLD

WEST DISINFECTING Company

WEST DISINFECTING COMPANY, 42-16 West Street, Long Island City 1, N. Y.
Branches in principal cities • In Canada: 5621-23 Casgrain Avenue, Montreal
☐ Please send your 24 page booklet "The Control of Dermatitis in Industry."
☐ Please have a West representative telephone for an appointment.

Name.....

Position.....

Mail this coupon with your letterhead to Dept. 19

For more facts circle 652 on Reply Card

BIDDLE *Instrument News*

Meg® Type
of Megger
INSULATION TESTER

With NEW A-R-K Switch Gives You ALL THESE FEATURES IN ONE INSTRUMENT

- Megohm Scale ÷ 1 and ÷ 10 (Formerly the A switch)
- Ohm Scale (Formerly the R switch)
- Capacitance Discharge (Formerly the K switch)
- Earth, Line and Guard terminals—no need to change terminal connections when switching to ohm scale

This multi-purpose switch affords you all these features in one instrument. Available with voltages of 500 or 1000 volts d-c and with ranges from 0 to 20 up to 0 to 2000 megohms—0 to 10,000 ohms.

For prices and specifications write for **BULLETIN 21-45 PL**

Biddle Motor and Phase Rotation Tester (*Dual Purpose*)

With it you can...

- **Determine the direction of rotation of electric motors before they are connected to the line.**
- **Determine the phase rotation or sequence of energized power circuits.**

Here is a positive means for determining which motor leads must be connected to certain conductors of a supply system to insure that the motor will rotate in a prescribed direction when energized.

This device will permit the electrical contractor or industrial maintenance electrician to permanently connect and tape the terminals of the motor being installed, without having to first energize the motor by a temporary "hook-up" from a power source, if available, to determine its rotation.

Housed in a sturdy oak case 12¼" x 8¼" x 4¼" this compact unit weighs approximately 10 pounds and is supplied complete with 3 line and 3 motor leads which store in the compartments either side of the instrument panel.

For complete details write for **BULLETIN 80-PL**

B-713

JAMES G. BIDDLE CO.

- ELECTRICAL TESTING INSTRUMENTS
- SPEED MEASURING INSTRUMENTS
- LABORATORY & SCIENTIFIC EQUIPMENT

1316 ARCH STREET
PHILADELPHIA 7, PA.

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"Paper" Cafeteria

(Continued from page 236)

the ventilation, noise and steam problems of dishwashing. This permits the unit to get along with two small hoods—over the ovens and coffee urns.

Other minimal cafeterias have been installed in such plants as Republic Aviation's Port Washington plant, where a compact kitchen serves also as a cafeteria, and at United Merchants and Manufacturers' Drapery Division in New York. In such cases, plant engineers, working with caterers or company food service managers, have helped to streamline the food service installation to the point where it could function efficiently and at low labor cost in minimum space and with minimum equipment. **End**

Plant Protection Systems

(Continued from page 102)

each floor level could be individually zoned, resulting in a third digit of each device in that building.

If more than nine levels are involved, further grouping would be necessary. In this way the first three digits of the code number indicates 1. a device operating in a specific known area or zone, and 2. the level in the specific building. The number assigned to each floor level depends on building layout. For example, a number from 1 to 9 may be assigned to boxes or devices in order of distance from the entrance, or by north to south, or east to west.

In the case of large single buildings, the same procedure could be followed in setting up zones or quadrants within the total building area. For ease in identification of alarms by the operator at the recording units, an easily read bulletin board should be provided.

Each code number used in the entire system should be listed in numerical progression, followed by the spelling out of the exact location of the device (for example 6-7-8 Research Building, 7th floor, Center Corp.). Any device, whether it be a manual fire alarm, automatic alarm, water-flow or supervisory unit, should follow the same coding procedure for the area, since each type of device so operated precedes the code by indicating the type of alarm being transmitted.

Responsibility of plant engineer-

NEW Airco POP can seals out dampness...

keeps stainless steel electrodes "oven fresh" in re-usable aluminum container — eliminates special storage facilities!

Airco Stainless Steel Electrodes are now packed in seamless aluminum containers. Each "POP" can contains 10 pounds of electrodes, and is sealed with a waterproof airtight industrial tape.

This hermetic electrode packaging technique is the best way to keep stainless steel electrodes "oven fresh"—without benefit of special shop or field storage equipment. Unused electrodes can be kept fresh by resealing the can.

Airco Stainless Steel Electrodes, in the "POP" can, are but one of many types in Airco's complete line that also includes hard-facing, cast iron, mild steel, general, and special purpose electrodes. Send for the free Airco Electrode Guide which will help you select the right electrode for your special job.

AT THE FRONTIERS OF welding PROGRESS YOU'LL FIND . . .

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For more facts circle 654 on Reply Card

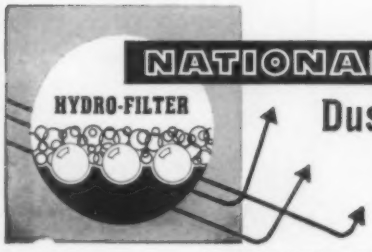
WHO SAID you can't combine efficiency and ease of maintenance in a dust collector?
EFFICIENT. Turbulent area of water, bubbles and mist assures constant, sustained air water contact.
EASY MAINTENANCE. Dust never comes in contact with dry surface. Sludge is settled, removed automatically. Glass spheres are self-cleaning.

Hydro-Filter offers real simplicity to wet collection problems

Simplicity is the *success* of the National Hydro-Filter and is why it offers constant dust collection efficiency to the micron range *combined* with low operating costs and maintenance that amounts to but *minutes a month!*

Look at the photo—Every inch is *active* space. There is nothing to clog, no baffles to "load up" and reduce efficiency. Water, air and glass spheres do the work and a constant flow of water carries contaminants to the sludge tank where they are automatically ejected.

Sound simple? . . . It is, and the whole story on Hydro-Filter is contained in a comprehensive bulletin that is available on request. Write for your copy today.



Dust Collector Corp.
604 Machinery Hall Bldg.,
Chicago 6, Illinois
Subsidiary of National Engineering Company,
Manufacturer of Simpson Mix-Mullers.

For more facts circle 655 on Reply Card

Plant Protection Systems

(Continued from page 238)

ing does not cease with the completed installation of the system. Maintenance and periodic testing should be well programmed. Each battery in the multicell bank should be numbered with acid resistant paint or lead tags. Log sheets, Fig. 4, should be prepared to record conditions. Monthly checks seem to be adequate for the average system.

In some cases it has proven economical to place a temperature and voltage-compensated relay into the charging system to control the charge rate to an hourly demand. This prevents the possibility of over charging, but still maintains a sufficient charge. It will survey the battery condition automatically each hour and if a charge is needed the demand is satisfied. Otherwise the charger remains inactive.

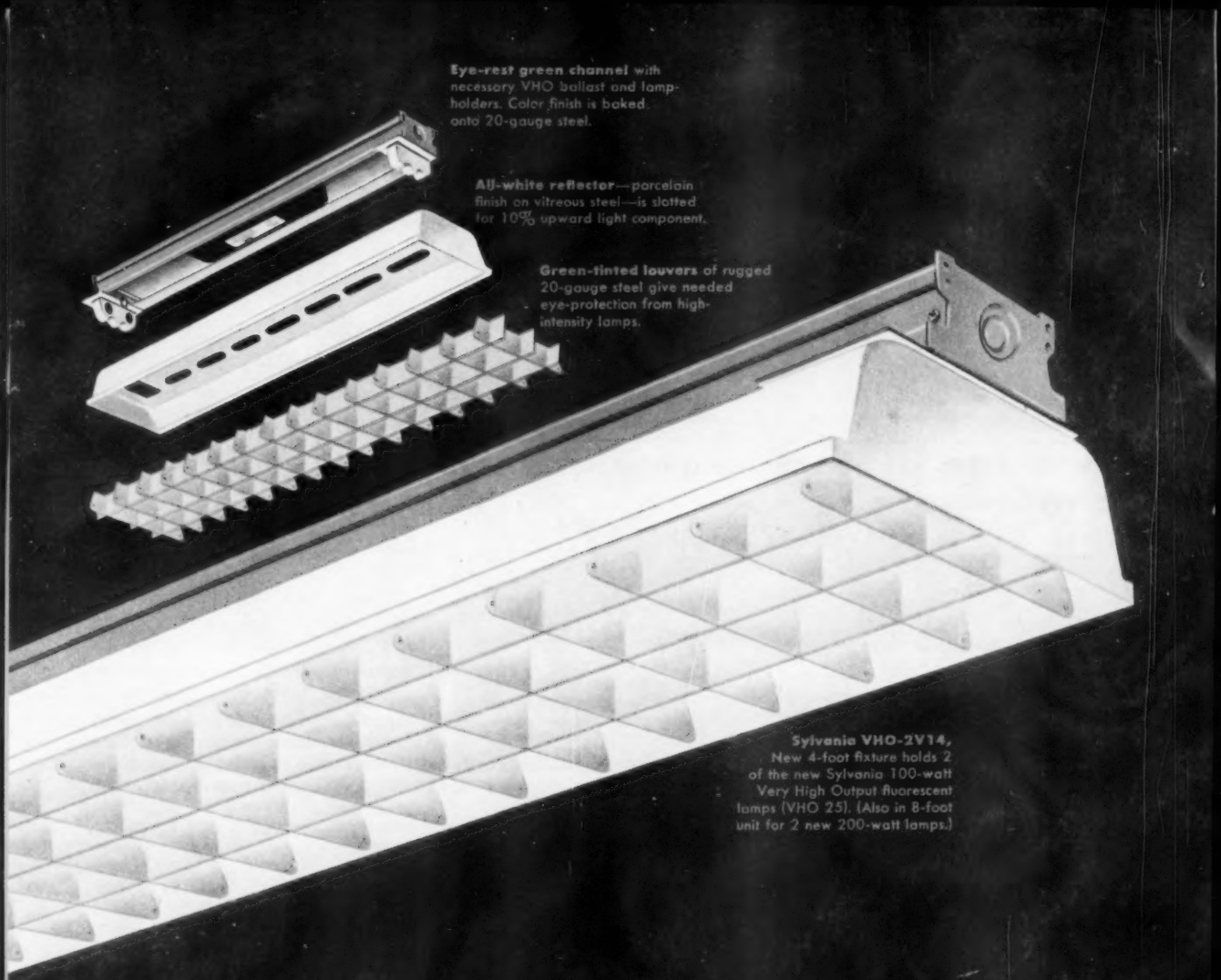
Little Maintenance Needed

Little maintenance of the actual system is needed. Essentially, it amounts to periodic checks of the overall resistance of the wiring network, to maintain the resistance within the limits recommended by the manufacturer. A periodic test of the alarm transmitters is, however, of prime importance. This is best accomplished by scheduling, at varying hours each month, the operation of several boxes under near-alarm conditions. Only the personnel involved in the testing, as well as the fire station attendant, should be notified in advance of the actual test.

Test forms should be prepared for use during these regular test periods. The content of the test forms must be tailored to the particular function of the institution. Figure 5 illustrates a form designed for an integrated medical center and hospital of the type we have at UCLA. It can be seen that this test record is rather specific for this type of operation.

Plant engineering can gain much information and insight by review of the completed test form. In this way, we may observe how a system, as well as personnel involved, will perform under actual or near actual conditions.

Our role, therefore is not only in the design, but in the continued evaluation of this vital plant protecting system. **End**


Eye-rest green channel with necessary VHO ballast and lamp-holders. Color finish is baked onto 20-gauge steel.
All-white reflector—porcelain finish on vitreous steel—is slotted for 10% upward light component.
Green-tinted louvers of rugged 20-gauge steel give needed eye-protection from high-intensity lamps.
Sylvania VHO-2V14, New 4-foot fixture holds 2 of the new Sylvania 100-watt Very High Output fluorescent lamps (VHO 25). (Also in 8-foot unit for 2 new 200-watt lamps.)

NOW—Light Output Doubled!

New Sylvania VHO Special Fixture Series

for quality lighting with the sensational new fluorescent lamp

Sylvania's new VHO Special Fixture Series harnesses the tremendous light output of the sensational VHO lamps and puts it to work effectively for you.

These higher wattage VHO lamps—recently developed in the Sylvania laboratories—mark a milestone in today's industrial lighting revolution. Though no larger in size, they deliver more than double the light output of regular fluorescents of the same length.

Sylvania's new VHO Special Fixture operates these lamps with a minimum of glare and a maximum of eye comfort. Its "eye-rest" green channel and green tinted louvers add cool chromatic eye-comfort. Its white porcelain reflector is slotted for 10% upward light component to mellow harsh contrasts overhead.

Picture, in your own plant, where these fixtures might work effectively for you . . . in inspection areas or precision machine locations . . . for close tolerance work or for general high-bay areas.

See for yourself what Sylvania's new VHO lighting can do for morale and plant production rates, reducing the number of rejects. See how its one-man maintenance features will cut down operating costs. Talk to your local Sylvania Fixture Specialist, or write direct for full details.

SYLVANIA ELECTRIC PRODUCTS INC.
Dept. K-3, Lighting Division—Fixtures
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SYLVANIA
. . . fastest growing name in sight

LIGHTING • RADIO • ELECTRONICS • TELEVISION • METALS & CHEMICALS

For more facts circle 656 on Reply Card

NEW BOOKS

for the plant engineer

Automation

PRACTICAL AUTOMATION. Size 11¼ by 8⅞ in.; 376 pp including index; illustrated; cloth bound. Published by McGraw-Hill Book Company, Inc., 330 West 42nd St., N.Y. 36, N.Y. Price $7.50.

INSTALLATION and use of plant automation is treated in this practical guide, which includes examples from plants of various sizes and industries. The book shows how to combine machines and equipment already in the plant and where to look for possibilities of applying feedback control. It offers ideas for increasing productivity, lowering operating costs, and improving safety and working conditions.

The four principal divisions in the book are: fundamentals of automation; automation in manufacturing; plant engineering and the maintenance for automation; and the management of automation.

Among the topics with which the book deals are the following: automation in job shops and small plants; automating inspection; controlling equipment with coded information; plant engineering for automation; instruments and controls for automation.

On Fasteners

FASTENERS HANDBOOK BY JULIUS SOLED. Size 9¼ by 6¼ in.; over 400 pp; illustrated; cloth bound. Published by Reinhold Publishing Corporation, 430 Park Ave., New York 22, N. Y. Price $12.50

COVERAGE OF FASTENERS in this book is unusually complete, accurate, and up-to-date. Material in the book has been supplied by major manufacturers and also smaller ones. In addition, there are contributions from industry associations.

This reference book relates the actual uses of fasteners in one industry to those of another. It includes information on the many specialized fasteners developed since the Second World War as those that increase structural safety and reliability.

In addition to having a manufacturers directory, the book contains separate sections on the following: rivets; inserts; screws, bolts, and nuts; washers; retaining rings; pins; nails; metal stitching; quick release fasteners; masonry anchoring devices; and hose clamps.

Industrial Water

INDUSTRIAL WATER AND INDUSTRIAL WASTE WATER. Size 9 by 6 in. approx; 52 pp; cloth bound. Published by American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price $2.00.

ALMOST EVERY MAJOR industry requires large quantities of water for power, steam and processing. At the same time the demands for purity and control of corrosion have made the task of supplying industrial water more formidable.

This book offers some information on industrial water included in papers that were presented last year at the Second Pacific Area National Meeting in Los Angeles under the auspices of ASTM Committee D-19 on Industrial Water. Among the subjects discussed are those of sea water purification and use of organic flocculants and flocculating aids.

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*load brakes
Powerful disc and helix type with high safety factor.
*controllers
Only proven equipment of more than ample rating is used. Full overload protection.
*motors
Totally enclosed high torque units of 55°, 30 minute rating.
*wheels
Large diameter, high carbon cast steel.
*bearings
Anti-friction bearings used throughout. Oversized roller bearings (double row) used in main truck wheels.

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*In any crane, these are the parts that handle the heavy work... the parts that *must be* top quality if you're looking for crane *dependability*. Compare Cranemaster engineering at these critical points with any industrial shop crane. Then compare prices. Time and time again Abell-Howe proves it has the top value in overhead traveling cranes... in capacities to 20 tons—spans to 60 feet.

Send for BULLETIN C-101

7747 Van Buren Street ABELL-HOWE COMPANY Forest Park, Illinois

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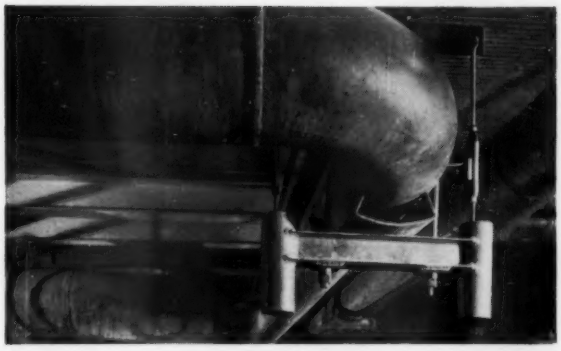
BLAW-KNOX has what it takes—to provide these products and services

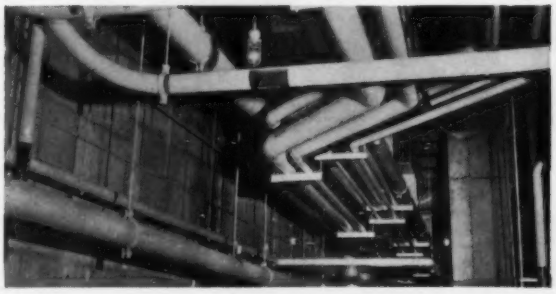
A Blaw-Knox automatic sprinkler system could have prevented this disastrous fire. Each year a serious fire strikes one out of seven manufacturing firms in this country. And out of every 100 firms who lose their records in a fire, 43 never reopen for business. So why take any chances.

Blaw-Knox engineers, fabricates and installs automatic sprinkler systems that are always alert to detect, confine and quench a fire at its origin. Qualified engineers custom-design systems that meet individual requirements—and fulfill all insurance standards and municipal codes. A Blaw-Knox automatic sprinkler system pays for itself in a few years through savings in reduced insurance premiums.

Let a Blaw-Knox fire-protection engineer study your needs, submit a layout and estimate, and tell you how you can pay for the system on our lease or deferred payment plan. For more complete information, write for Bulletin No. 2426—"Fire Can Destroy Your Business."



Blaw-Knox trapeze functional spring hangers, with the patented internal swivel action, support power piping in new generating station. Our experienced engineers are available to both design and make recommendations for your hanger requirements. For further information, send for Catalog No. 54.



High temperature, high pressure oil tunnel piping in large steel mill is typical of many piping systems prefabricated and erected by Blaw-Knox. Experienced piping engineers, modern shop facilities and a new Blaw-Knox digital computer method for fast, accurate calculation of piping stresses are available to you. Let us know your requirements and we will provide the service you need. For additional information, write for Bulletin No. 2443—"Piping for Industry."

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Complete facilities for prefabrication and erection of piping systems for all pressures and temperatures ... complete line of standard and custom-engineered pipe hangers, supports and vibration eliminators ... complete line of automatic sprinkler systems for standard and special hazards

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When your purchasing department provides you with WB portable cord you can be sure that they are giving you a premium cord that will save you time, trouble and money by minimizing replacements.

WB DYNAPRENE 14/2 SO and larger is listed by the U. S. Bureau of Mines and Pennsylvania Bureau of Mines, identification number P-118 BM.

FOR YOUR CONVENIENCE this tough, long-lasting cord is put up in 250 ft. spools in sizes up to and including 16/3.

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BULLETINS

(Begins on page 21)

150 Stainless Steels — This 32-pp catalog offers description, chemical composition, strength factors, physical properties and typical applications for a broad range of stainless types including the 200, 300 and 400 series of stainless steels. The catalog also covers forging ingots and rolled in surface patterned steels. Sharon Steel Corp.

152 Cold-Finished Steel Bars—This 5-pp, 11 by 17 in. wall chart shows AISI grades of cold finished steel bars, which satisfy more than 95 per cent of current specifications, as well as their complete chemical analysis. Machinability ratings are also given in surface feet per minute or as a percentage rating compared to AISI Grade B1112. Among other data, it gives grades of screw machine steels, resulphurized carbon steels, open hearth steels, alloy steels, and includes a table of weights. La Salle Steel Co.

153 Residual Stresses—Helpful Data Bulletin 16, 36 pp, discusses residual stresses in cold finished steel bars and their effect on manufactured parts. Specific subjects covered range from residual stresses in cold drawn, ground, turned, and heat treated steels to discussions of fatigue, cracking, machinability, tolerances and corrosion. La Salle Steel Co.

154 Stress Rupture Data — Bulletin TDC-153-B furnishes results of stress rupture tests on 14 steels, including carbon steel, several alloy steels and 10 stainless steels. Tubular Products Div., The Babcock & Wilcox Co.

HEATING

155 Steam Heating Coils—Catalog 1710, 26 pp, contains pictures and descriptions of commercial and industrial steam heating coils. Gives information on features, construction details and applications, and provides piping diagrams and many performance and selection tables. Sturtevant Div., Westinghouse Electric Corp.

156 Resistance Wire Ribbon—Catalog M-57C, 16 pp, describes a nickel-chromium-iron resistance alloy, used on electrical heating applications where temperatures do not exceed 1700 F—and for certain "cold" resistor applications which do not exceed 800 F. Includes list prices and specifications for a complete range of standard Chromel-C wire diameters and ribbon widths and thicknesses. Hoskins Mfg. Co.

MATERIALS HANDLING

158 Lift Trucks—Three questions most often asked by lift truck owners and operators are answered in 16-pp Form 1498 which describes company's four lift trucks in the 15,000- to 20,000-lb load capacity. These questions are "What will the truck do?", "Will it stand up in tough service?", and "Is it easy to service?" Hyster Co.

159 Materials Handling—In addition to showing a combined trailer-towline order picking system, and the application of balance style trucks to trailer-train operation, 12-pp Jr. Catalog 58G illustrates 52 models of two-wheel trucks, 12 types of dollies, wagon trucks, platform and shelf truck models, casters, jacks and semi-live skids. It also includes information on free-wheeling, demountable rubber tired wheels. Nutting Truck and Caster Co.

160 To Keep Materials Moving—Form 663, 36 pp describes two lines of job-engineered conveyors and pre-engineered (packaged) conveyors, and includes complete dimensional and specification data as well as photos, drawings and diagrams. Attention is also given to such accessories as drive types, head and tail sections, supports, rock ladders, troughing and support idlers, types of belt take-ups, and hoppers. Pioneer Engineering.

161 Conveying Equipment—Catalog 36, 40 pp, features 140 actual installation photos covering gravity and power conveyors and their application to present day methods of flow operation and automation. Shows where and how to use the principal types of conveyors to cut operating costs. Both standard and special installations shown. Logan Co.

162 Conveying Corn Starch—How one man can unload 50 tons of raw corn starch in two hours is the subject of this technical article, a study of the pneumatic conveying system installed in one typical plant. Explains how spillage and contamination were overcome while appreciably cutting costs of materials handling. Fuller Co.

PLASTICS, SYNTHETICS

165 Polyethylene Film—This condensed data sheet covers applications of polyethylene film for production, maintenance and protection, including applications in concrete curing, protective coverings, weather protection and shipping and/or storage jackets. Tabulates physical properties and details resistance to moisture, corrosion-causing vapors, alkalis, acids, oils and greases. Koppers Co., Inc.

166 Plastic Coatings—"Fluidized Plastic Coatings for Corrosion Resistance" is the title of this 6-pp article covering such topics as the mechanism of fluidization, coatings available, cost factors, and applications. Photos illustrate typical parts that can be fluidized coated, and tables furnish technical data on corrosion resistance of fluidized polyethylene coating and fluidized coating materials. American Agile Corp.

167 Nylon Applications—This set of nylon application literature contains a series of case histories designed to assist in applying nylon parts in a variety of industries. Stories are indexed according to standard industrial classifications and include information on chemical, electrical, machine tool, textile, instrument and other fields. The Polymer Corp. of Pennsylvania.

168 For Plastic Finishing—Eight-pp Bulletin 228 describes Rotoblast deflashing equipment designed for efficient cleaning and finishing of all types of plastic parts. Containing specification and application data for both the barrel for mass production cleaning and the table for quick deflashing of fragile parts, bulletin details construction features and operation. Pangborn Corp.

STANDPIPE, HOSE

169 Standpipe and Hose—Inspection, maintenance and protection of standpipe and inside hose systems is covered in this 8-pp Safety Code. Reviews various services performed by a standpipe and hose system, and provides specific guidance for periodic inspection of all system components, as well as instructions for maintenance of hose, couplings, and nozzles. Fire Equipment Manufacturers' Association, Inc.

170 Metal Hose Products—Catalog ID-100A, 12 pp, describes flexible metal hose for conveying gases, solids and fluids under high temperature, pressure and vacuum conditions. Complete specification data is included, as well as photos and drawings illustrating design features. Universal Metal Hose Co.

OTHER EQUIPMENT

171 Storage, Processing Tanks—Catalog 65, 48 pp, contains technical data, illustrations and price information on a line of metal and wood tanks for storage and processing. Covers elevated and ground storage tanks, field-erected, shop-built pressure and vented tanks, as well as mechanical equipment. W. E. Caldwell Co.

172 For Chemical Processing—This 16-pp manual describes in detail 57 chemical processes in metal-working plants, and includes nine reference charts applicable to the industry. Processes discussed include cleaning, phosphating, conversion coating, protective coating, paint and carbon removing, rust removing and preventing, descaling, electroplating, inspecting, processing aluminum and maintaining of paint departments and other plant facilities. Turco Products, Inc.

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173 Fastener Sealant Data—Technical Report 5 is a 12-pp illustrated discussion on Loctite sealant, a liquid lock for threaded fasteners. Tells what it is and how strong it is, and compares locking torque with that of locknuts and lockwashers. Properties are described and instructions for applying Loctite are given. Information on use provided. American Sealants Co.

174 Electrical, Mechanical Products—Electrical and mechanical products manufactured by this company, including anchors, toggles, masonry drills, wire connectors, straps and clamps, wiring tools, snap-straps, fuse specialties and testers, and industrial products, are described in 38-pp Catalog 12B.

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BULLETINS

(Begins on page 21)

Features are fully detailed and size and specification data included. Holub Industries, Inc.

175 Filing Unit—Advantages of Verti-File open shelf filing units are outlined in this 6-pp bulletin. Describes construction features and floor-saving advantages and includes dimensions. Deluxe Metal Furniture Co.

176 Visible Record Keeping—Eight-pp Bulletin KD-829 describes features and applications of the Kardex visible record keeping system which makes instantly available, in an organized way, a comprehensive range of facts and figures. Includes information on design and color changes, as well as dimensional data and specifications. Remington Rand Div., Sperry Rand Corp.

177 Two-Way Radio—Sixteen-pp Bulletin ECR-479 describes two-way radio communication for various commercial and industrial applications. Covers such matters as how far user can talk, licensing, dependability of equipment, and engineering, as well as adaptability, convertability and interchangeability. General Electric Co.

181 Insulation Chart—This selector chart covers electrical insulation materials in the A, B, and H temperature classes. Over 30 types are described. Product descriptions cover base materials used, suggested applications, temperature class and available finishes. Gage, type of backing, tensile and dielectric strength and specifications are given for each of the materials covered. Electro-Technical Products Div., Sun Chemical Corp.

182 Demineralizers — Bulletin 108-A, 8 pp, features a step-by-step explanation, including formulas, for the "run" of demineralization and the regeneration process. Internal arrangements and operation of basic types of demineralizers for varying water requirements are covered, and types of valve and control arrangements are discussed. Flow chart drawings are included. L & A Water Softener Co.

183 Automation for Process Industries—This 16-pp illustrated brochure clarifies some broader aspects of automation and indicates procedures found useful for its development and application within the process industries. Illustrations show results of replacing variable factors inherent in mechanization with electrically and mechanically controlled movement. Automation Div., Patterson-Emerson-Comstock, Inc.

Among this Month's New Literature of Special Interest

178 Data Automation System—Features of the Univac II data automation system are described in this profusely illustrated 80-pp manual. A guide to the Univac II system, the manual contains five sections: description and illustration of available equipments and their function; a non-technical guide to the binary number system and the sevenplace code of the Univac II system; a technical description of how the central computer is organized functionally, an explanation of the system's entire repertoire of instructions, and illustrations of how the computer responds to special conditions. Remington Rand Univac, Div. of Sperry Rand Corp.

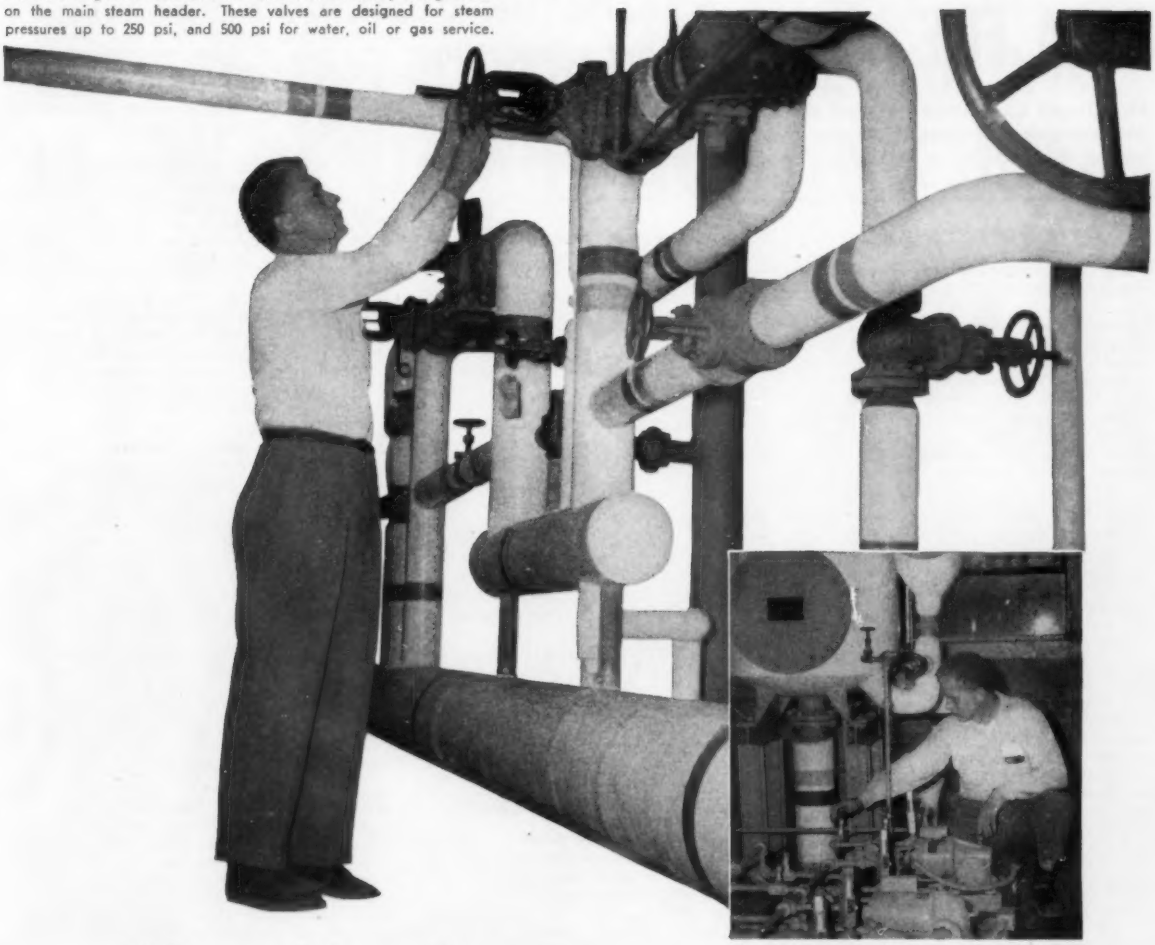
179 Boiler Selection Survey—This 6-pp selection survey form, SA-178, is designed to provide a means of selecting most suitable boiler for a particular application. Provides information on electrical supply, type of fuel to be used, boiler room size, special components or openings, boiler feed water, noise control, steam requirement estimate, and special instructions. Orr & Sembower, Inc.

180 Power Transmission Data—This 1957 handbook contains 186 pp of power transmission data compiled and revised to meet modern engineering standards and tabulations, and calculated to plan proper transmission for any drive. Contains engineering charts, tables and formulae. Gear section tabulates complete dimensions of standard spur, bevel, spiral, helical, worm gears and steel rack. Speed reducer section gives specifications, dimensions and vital mechanical information necessary to select proper reducer in relation to required ratios, horsepower, torque and installation dimensions. Available to qualified plant engineers, please state your job title when requesting this. The Ohio Gear Co.

184 Electrode Guide—Among the many helpful features of 70-pp pocket-size Catalog 1318, is an electrode consumption calculator which tabulates data for calculating consumption per linear foot in welding of various types of joints. Describes each electrode, its color code, its application, and best procedure for use in welding. Weld metal chemical analyses and mechanical properties are fully explored. Such related information as the factors which determine electrode selection, specifications for filler metals, and testing of deposited weld metal is also discussed. Air Reduction Co., Inc.

185 Maintenance, Safety Equipment—Catalog 31 contains 64 pp of information for selecting and ordering metal-working tools, motor and generator maintenance equipment, flexible shaft machines, safety equipment, electrical and mechanical maintenance products. Profusely illustrated with photos and detail drawings, it covers all standard items, including rotary burs and files, metal-cutting saws, mica undercutters, field coil testers, growlers, test instruments, and portable blowers. Martindale Electric Co.

The Chief Engineer closes an 8-inch Walworth Iron Body Wedge Valve on the main steam header. These valves are designed for steam pressures up to 250 psi, and 500 psi for water, oil or gas service.



Chief Engineer Bruce W. Martin checks Walworth Bar Stock Valves in chemical feed pump lines to boiler and feed water. These carbon steel valves are built for ratings up to 3000 psi. Stainless steel bar stock valves are also available for very severe service.

"from big gates to little globes"...

The power plant at the Michigan School for the Deaf has an operating capacity of 25,000 lbs. per hour generated by three 200 hp and one 60 hp oil-fired boilers. Built four years ago, the plant is now the responsibility of Chief Engineer Bruce W. Martin who says: "This plant was designed and constructed for efficient operation, and a lot of that efficiency depends on the valves. From big gates to little globes installed here, we use a wide variety of Walworth Valves. They give us the dependable, trouble-free service we want and expect. I would recommend them to anybody for similar service."

Walworth's complete lines of valves are built to provide long range service and savings. There's a Walworth Valve in a type, size, and material to serve you . . . Gate, Globe, Angle, Check, and Lubricated Plug Valves in a variety of pressure ratings. The next time you need valves or have a problem concerning flow control, call your Walworth Distributor, or, write Walworth direct.

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DATA FILE of literature for the plant engineer's library

STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 245-246.

CONSTRUCTION

301 Aluminum Building Products — Form AD 285 is a 32-pp catalog covering company's line of aluminum industrial building products. Cites advantages of aluminum, pictures some installations. Installation data, weights, dimensions and roughing-in details are provided on corrugated roofing and siding, V-beam roofing and siding, ribbed siding sheet, perforated corrugated sheet, flat flashing sheet. Aluminum Co. of America.

302 Data on Panel Material—How to improve factory methods with Masonite Presdwood is discussed in this 12-pp illustrated bulletin. Advantages are listed and types of presdwood used in maintenance and materials handling are indexed. Which type to use and where are covered. Masonite Corp.

303 Need a Building? — This attractive 32-pp brochure pictures and describes some industrial structures custom-engineered and built by the company. Shows how firm constructs building in one "package" to provide a permanent, custom-built structure with maximum usable floor space. Emphasis is placed on concrete panel construction. Abell-Howe Co.

304 Standardized Construction—This 28-pp illustrated catalog on company's system of standardization in building construction presents a description of "F" buildings, a versatile series of flat-roof structures. Luria Engineering Co.

305 Fir Plywood — This 34-pp construction guide contains full-page structural drawings providing basic information on types, grades, and applications of fir plywood. Booklet covers information on floor construction, single and double wall construction, and roof construction. It is designed for maximum simplicity of use and quick reference, bound in notebook form. Douglas Fir Plywood Association.

306 Wire Partitions — The modern, economical approach to plant layout problems is described and illustrated in 8-pp Bulletin P-55 on wire partitions and custom enclosures. Describes important design and construction features, and includes specification data and dimensional diagrams. Wire and Iron Products Inc.

307 Partitions and Walls—Low cost sound-absorbing partitions and walls designed for movable and flexible office enclosures are featured in this illustrated bulletin. Dimensional diagrams and specifications are included, also installation photos. GR Products, Inc.

308 Panel Wall Construction — The advantages of company's M-Type Q-Panel walls are outlined in 12-pp Bulletin Q35-55. Includes installation photos, diagrams, specifications, as well as drawings, pointing out structural details. H. H. Robertson Co.

309 Replacement Glazing — Twelve-pp Booklet PL-251 gives detailed information on glazing industrial and other buildings with flat panels of the acrylic plastic, Plexiglas. Written for plant engineers concerned with frequent breakage of windows or other glazing problems, this practical booklet gives properties of this sheet. Plastic Dept., Rohm & Haas Co.

310 Steel Floor Plate — Skid resistance and other advantages of multigrip rolled steel floor plate are stressed in this illustrated bulletin. Also gives dimensions, weights, data on allowable loads. United States Steel Corp.

311 Non-Slip Flooring — Algrip, an abrasive rolled steel floor plate described as non-slip even on steep inclines, is the subject of Booklet AL-29, 8 pp. Discusses safety features; fabricating. Alan Wood Steel Co.

STORAGE EQUIPMENT

312 Storage Equipment — Catalog 100-F, 72 pp, illustrates and describes company's complete line of steel cabinets, folding chairs, work benches, tool stands, shelving, tool storage, lockers, coat racks, filing cabinets, revolving bins, others. Includes dimensions and specifications, installation photos. Lyon Metal Products, Inc.

313 Adjustable Shelving—How this shelving can save assembly time is explained in 28-pp Form 2111. Photos and drawings of various types of shelving units, including open and closed shelving, bin units, ledge shelving, counter shelving, cabinets with swinging and sliding doors, parts and accessories are included. Standard Pressed Steel Co.

314 Towards Neater Stockrooms — Prevention of accidents through good housekeeping, orderliness and neatness in stockrooms is stressed in three large posters offered by the company. How steel shelving encourages neat stocking is the theme of the posters. Deluxe Metal Furniture Co.

MAINTENANCE

316 Basic-Roofing Information—"What You Should Know About Your Roof" is a 40-pp clearly illustrated booklet which tells what makes a roof fail, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of good re-roofing job. Johns-Manville.

317 Roofing and Siding Data—This folder contains Bulletins 2032, 2032A, B, C and D on corrugated Asbestone roofing and siding, stud well fasteners, staggered joint application and straight joint application. Includes specifications, as well as photos and dimensional drawings showing construction details. National Gypsum Co.

318 Handbook on Coatings — This 1957 Coatings Manual is a 32-pp treatise highlighting the stopping and preventing of rust on nearly all types of rustable metal. Illustrated in full color, this book contains information and recommendations to enable accurate determination of specific coatings needed for the job. Basic principle of Rust-Oleum's fish oil penetration into pores of metal is illustrated. Application photos give new ideas for protecting girders, tanks, boilers, roofs, other surfaces. Over 100 color chips. Rust-Oleum Corp.

319 Painting with Aluminum — This helpful booklet describes advantages of aluminum paints, describes three basic types for non-absorbent surfaces, for weather-exposed wood, and for heated surfaces and those not exposed to weather. Typical maintenance applications are covered in text and picture, and practical suggestions are given. Aluminum Company of America.

320 Repairing Concrete Floors — A seven-step procedure for repairing concrete floors with non-shrink mortar is described in this folder, EPMM-4. Each step is illustrated with an actual photo and description of step involved. The Master Builders Co.

321 Better Floor Care — This illustrated folder describes products designed to aid efficient floor care. Lists combination Srubber-Vac machines, conventional scrubbing - polishing machines, steel-wool pads, applicators, vacuum cleaners, mop trucks and other equipment. Finnell Systems, Inc.

322 Light Scaffolds — This series of illustrated bulletins describes company's line of aluminum alloy Up-Right scaffolds and accessories. Pictures one-piece sections and multi-section models with various ranges of adjustability. Points out such features as locking hooks which provide automatic security and locking casters for safety on stairways and inclines. Up-Right Scaffolds Div., Up-Right, Inc.

SLINGS, CHAIN, WIRE ROPE

323 Sling Handbook—The 64-pp Tuffy Sling Handbook is replete with illustrations, charts and diagrams describing 16 factory fitted slings and nearly two dozen standard fittings available for slings, including several which are recent additions to the line. Book contains a complete rigger's manual, shop chart of ratings, an engineer's notebook and standard signals for directing operations of overhead traveling cranes. Union Wire Rope Corp.

324 Wire Rope Manual—"Inspection of Wire Rope," "Methods of Lubricating Wire Rope," "Use and Abuse of Wire Rope," and "Sheave Maintenance" are a few of many subjects covered in this 188-pp Wire Rope Manual, Catalog G-16. In addition, there are sections devoted to strengths and weights of wire rope, cable as-

Take Complete Advantage of the Latest Advancements in Factory Lighting with these

3 NEW BENJAMIN LIGHTING UNITS

Greater seeing comfort through more upward light. More light for the money with new higher-output fluorescent lamps. These are new trends in factory lighting. Trends that can help you get a greater return on your investment in machinery, equipment and personnel. Now, Benjamin offers a choice of three new lighting systems so you can take fullest advantage of these advancements. Each system embodies distinctive Benjamin design and construction features which add to its sustained efficiency and reduce maintenance and operation costs. When you specify Benjamin, you get the most out of the latest factory lighting advancements through outstanding features, such as those highlighted here. Benjamin Electric Mfg. Co., Des Plaines, Illinois.

1. Greater Upward Light
2. New 60° Apertured Top Reflector
BENJAMIN
3. The ONLY 800 ma. unit with metal-clad Springlex lampholders
MORE LIGHT UP means MORE SEEING COMFORT BELOW!

1. NEW RLM SD-1 Unit with 25% Upward Light

Seeing comfort in factories is greatly improved with this new Benjamin Upward Component Unit, certified by RLM. It provides higher quality lighting due to 25% upward light, 27° shielding and special high reflecting white porcelain enamel.

2. NEW BENJAMIN UNITS FOR 60" T-17 bi-pin lamps

Expansion and re-styling of Benjamin's 90/100-w line means that you can now get RLM apertured-top reflectors with 15% uplight—as well as a complete line of open and closed-end porcelain-enameled reflectors—in the popular 60" length.

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Now Setting the Pace in COMMERCIAL LIGHTING

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You do this regularly because it makes your car run better and last longer. The trifling expense protects you against loss.

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IDEAL **PREVENTIVE MAINTENANCE**

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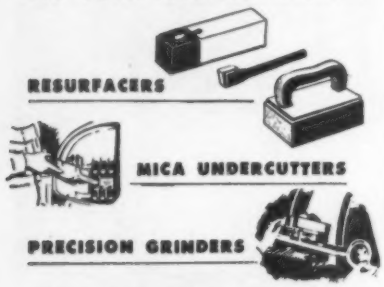

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For more facts circle 663 on Reply Card

DATA FILE

(Begins on page 250)

semblies, and rated capacity of slings. A complete reference guide on care and use of wire rope and slings, Manual is in handbook size and tab indexed. Available to qualified plant engineers, please state your job title when requesting this. Macwhyte Co.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

326 Portable Electric Tools — This standard catalog, Form 10, 24 pp, features portable electric tools, including electric drills, bench-drill stands, hole saws, buffing and polishing kits, sanders, polishers, grinders, hammers, saw blades, vacuum cleaners and others. The Black & Decker Mfg. Co.

327 Pipe Tool Ordering Guide—Catalog 2-51, 8 pp, covers company's line of threaders, cutters, vises, dies, tongs etc. Armstrong Bros. Tool Co.

328 Pipe Tools — Ordering and application information on Ridgid pipe tools is provided in 16-pp illustrated Catalog 7596R-5. Wrenches, cutters, threaders, reamers, vises, and others are pictured and described, also power drives, pipe and bolt threading machines, oilers. Capacity, price data included. The Ridge Tool Co.

329 Portable Tools—Industrial construction and other portable power tools for the manufacturing, construction, woodworking and metal-working industries are described in this 50-pp catalog. Tools appear in logical sequence of size and duty rating. Specification tables at bottom of each page permit easy selection. Skil Corp.

330 Industrial Tools — Information on a complete line of industrial tools, including 500 new types and sizes never before offered, is presented in 120-pp Catalog 57. Included are complete lines of wrenches, socket wrenches, drop forged clamps, tool holders, set up and hold down tools, cutting tools and pipe tools. Photos, drawings and numerous charts and tables designed to aid in selection of tools. Armstrong Bros. Tool Co.

331 Industrial Tools — Hand tools and shop tools for production lines, maintenance work and service departments are featured in 108-pp Industrial Catalog 54-1. Loaded with pictures and tool facts, the book describes in detail the complete line of over 4,000 tools — including chests and cabs, wrenches and sockets, screwdrivers, pliers, pulling equipment, tool assortments. Snap-On Tools Corp.

332 Data for the Shop—"Fluids and Facts for Metal Working" is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals. Standard Oil Co. (Ind.)

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Just put a Barry Leveling Mount on each machine foot and set the machine right where you want it. The built-in vibration control won't let the machine "walk".

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And even bigger savings pile up as you gain the cost-cutting advantages of flexible production lines.

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RESULTS GAINED with Barry Mounts in large and small plants point to important production savings in your plant. Write now for your copies of these helpful reports.

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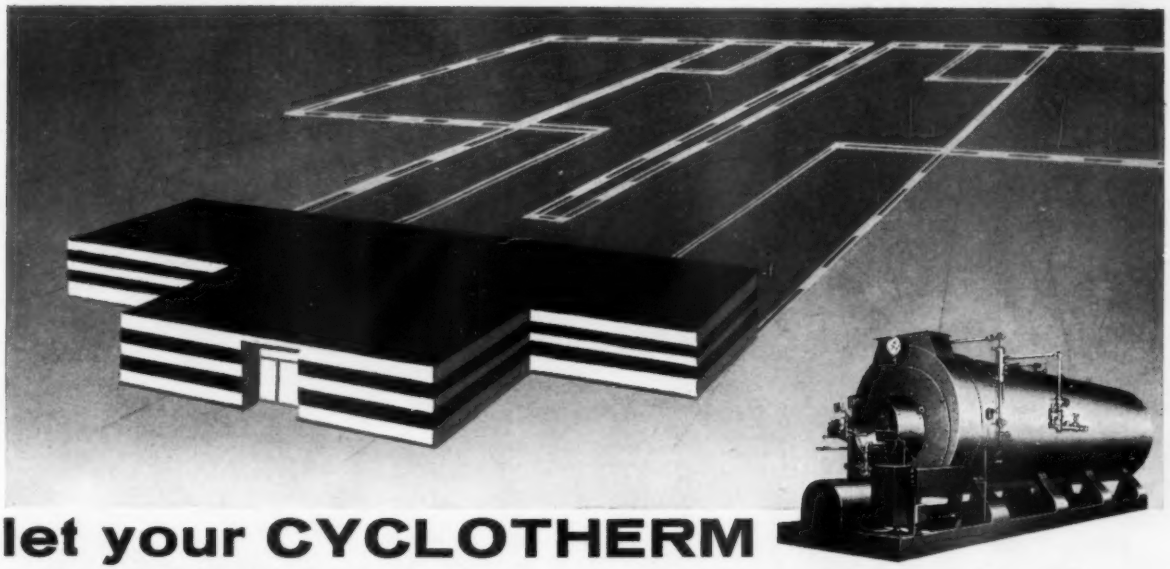

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How much steam will you need five years from now? Or ten? It's easy to blueprint your steam generating future with Cyclotherm Steam Generators. Cyclotherm permits you to add boiler horsepower as you need it. Units from 18 to 750 HP, in 18 sizes. You can add Cyclotherms to your steam capacity like a child adding blocks to a house.

The Cyclotherm is particularly well adapted to multiple installations. It's compact—takes up to one-third less space than other package boilers. It needs no excavation, no foundation. A simple flue takes the place of a towering stack. Completely assembled before shipment, the Cyclotherm is a working unit the minute it reaches your plant. And one manufacturing responsibility stands behind the entire equipment—boiler, burner, instrumentation and all.

Cyclotherm's Cyclonic Combustion guarantees a minimum of 80% efficiency in only two passes. Larger units operate at from 30% to 100% of rated capacity without losses of efficiency—smaller units operate on or off automatically as load requires. Maintenance costs cut as much as 50%. And the world-wide Cyclotherm service organization is always at your disposal. We'd like to plan your steam-generating future with you. Remember too that Cyclotherm is the only manufacturer who has specially designed a complete line of hot water boilers, output per hour from 670,000 to 6,700,000 BTU. Fill out the coupon and a Cyclotherm sales engineer will call.

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One Cyclotherm in 1949;
Five Cyclotherms Today

One of America's largest chicken processors is J. D. Jewell, Inc. (Jewell Whole Cut Up Chicken, Jewell Chicken Pie, etc.) of Gainesville, Ga. And here's how Jewell's growth has been matched by Cyclotherm installations:

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1954	150 HP Cyclotherm
1955	18 HP Cyclotherm
1956	80 HP Cyclotherm
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And when Jewell processes more chickens, it wil have more Cyclotherms to help process them!

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Please send me your booklet *Cyclotherm Cyclonic Combustion*, also rotogravure copy of *Cyclotherm Sales Steam* with illustrations and descriptions of Cyclotherm installations.

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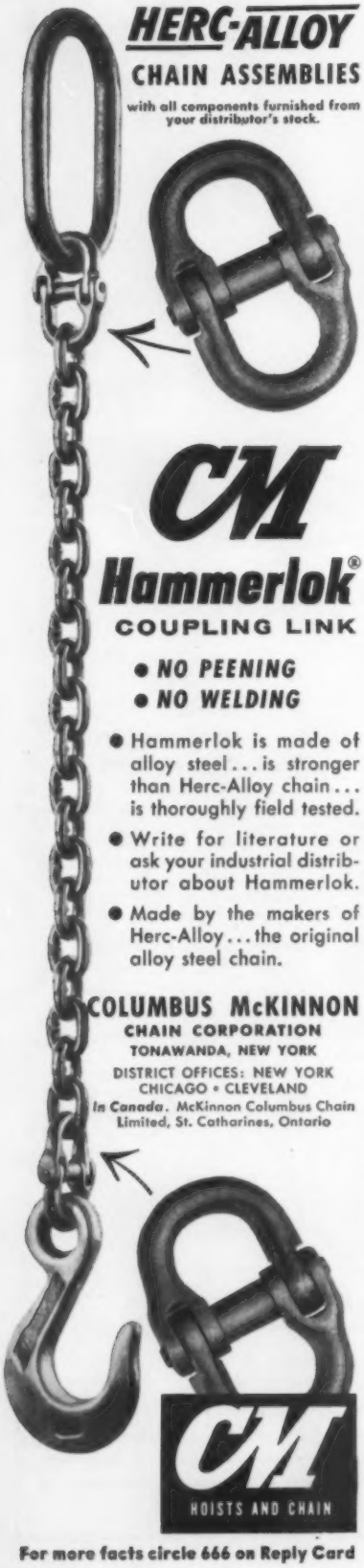

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DATA FILE

(Begins on page 250)

333 Electrode Guide — Catalog 1318 is a 58-pp pocket guide to electrode selection. Mechanical properties and testing of electrodes, specifications, classification and properties of electrodes, are among the data featured, and different types of electrodes are described. Air Reduction Sales Co., Div., Air Reduction Co., Inc.

FANS, VENTILATING

334 Roof Ventilators — Sixteen-pp, Bulletin A-112, revised, covers manufacturer's line of reversible roof ventilators, also penthouse Vertijet, rotary and other models. Sizes, specifications, performance data are included. Hartzell Propeller Fan Co.

335 Ventilation Units—Bulletin FM-315, 25 pp, describes basic construction of company's package propeller fans for commercial and industrial applications. Illustrated case histories of typical installations are included, as well as performance data rating tables, performance charts. Buffalo Forge Co.

336 Induced Draft Fan Data—In addition to providing an illustrated discussion of design advantages of company's induced draft Bifucator, 20-pp Bulletin DB-44-56 is an excellent working tool on fan selection. Two methods are presented, along with detailed examples of each. Also included are boiler code ratings of various organizations expressed in Btu/hr, and charts on draft losses. DeBothezat Fans Div., American Machine and Metals, Inc.

337 Industrial Fans—Bulletin 702A features company's line of fan equipment for industrial air and material handling applications. Photos illustrate various types available, and complete descriptive detail and a table of general data are included. Clarage Fan Co.

338 Air Engineering—Bulletin E-57 is a 24-pp air engineering data file covering engineering and test facilities for propeller fans, specifications, construction, maintenance, and installation. Tables for estimating air-handling requirements, entrance and elbow losses and duct sizes are provided. Also included are specifications for special-use equipment, corrosion-resistance and temperature guides, physical fan laws, definitions. Aerovent Fan Co., Inc.

339 Industrial Ventilation Guide — Bulletin 1521, 26 pp, covers company's heating and ventilating equipment suitable for all types of industrial applications. Numerous pictorial examples of installations are shown which present modern ventilation practices in all types of industry. A section is devoted to the correct procedures to follow in planning a ventilating plant system. Ilg Electric Ventilating Co.

DUST CONTROL

340 Dust Collectors — Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes sizes. The Kirk & Blum Mfg. Co.

341 Hydro-Filter—Bulletin 556 describes outstanding feature of company's hydro-filter for industrial dust collection. Cutaway view shows construction and design details, and diagrams showing dimensions and a table of capacities included. National Dust Collector Corp.

342 Industrial Dust Control—A wide variety of collection methods for industrial dust control is described in 16-pp Bulletin 922. A typical case history is included, as well as photos, cutaway views, drawings and capacity data on the various units. Pangborn Corp.

343 Flexible Tubing—Spiratube A and R—flexible, lightweight, reinforced fabric duct designed for carrying air and other gases, many solids, and liquid at low pressure—are described in 8-pp Bulletin 10C-1. Applications are described, and performance data included. Flexible Tubing Corp.

344 For Dust Collection—A collection of product sheets providing application suggestions and specifications on Dustkop equipment designed to solve a wide range of dust handling problems is provided in the Series 700 bulletins. Various models are described and typical installations illustrated. Also included is a section on accessories. Aget Mfg. Co.

MECHANICAL POWER TRANSMISSION

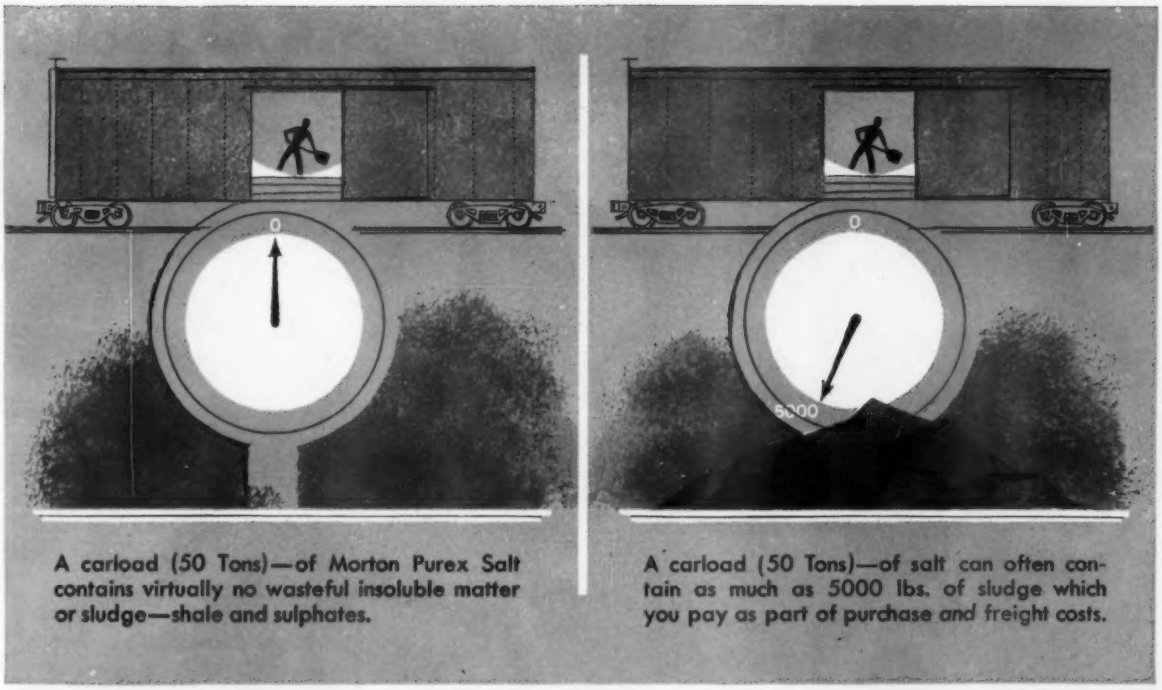
346 Fluid Drive—Eight-pp Bulletin 9819 describes and illustrates adjustable speed Gyrol fluid drives, 1- through 25-hp, giving advantages and applications. Components and operation are covered in detail and selection tables given for direct connected and V-belt types. American Blower Corp.

347 Helical Gear Drives—A new line of in-line helical gear drives is described in 16-pp Book 2651. Load classes for over 250 applications, overhung load ratings and dimension tables, instructions for proper selection and cut-away views of drives are given. Link-Belt Co.

348 Adjustable Speed Drives—Bulletin P B-4700-1 describes company's packaged adjustable speed drives—covering latest developments in design and construction. Tells how these packaged, pre-wired, pre-assembled units provide flexibility of d-c motor performance from an a-c power supply. Crocker-Wheeler Div., Elliott Co.

349 Coupling Data—Bulletin 240 describes a quick-connect, quick-disconnect H coupling, its uses and construction, with particular reference to U-packer which gives positive seal without compression set because of rubber distortion. A fully detailed cutaway of coupling is included and dimensions given. Snap-Tite, Inc.

350 Flexible Couplings—Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings for power transmission. Tells advantages



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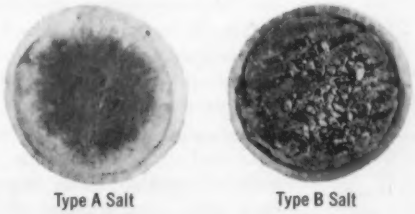
A carload (50 Tons)—of salt can often contain as much as 5000 lbs. of sludge which you pay as part of purchase and freight costs.

Stop paying for wasteful sludge —switch to Purex Salt

These filter pads (approximately 1/5 actual size) show you how much insoluble matter (sludge) you get in just 5 lbs. of various kinds of salt.



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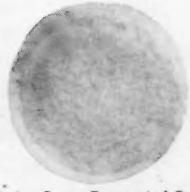

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...separates media

...washes

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automatically!

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DATA FILE

(Begins on page 250)

of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are detailed. Thomas Flexible Coupling Co.

351 Spacer Coupling—Of special interest to plant engineers concerned with operation of many pumps is Manual 4838 on this company's Type F Steelflex spacer coupling which has a quick-disconnect feature. Step-by-step illustrations show how to install, remove coupling and lubricate it during assembly. The Falk Corp.

352 Chains, Sprockets—Catalog 757, 68-pp, on company's stock roller chains and sprockets, stresses advantages gained through use of roller chain and pictures some typical roller chain drives. Tells how to select a stock roller chain drive. Provides specifications, ratings, prices and engineering data required for ordering. Book is generously illustrated with photos and drawings. Diamond Chain Co., Inc.

353 V-Belt Economy — Disadvantages of makeshift and other ill-advised means of coping with stretched or broken V-belts are discussed briefly in this folder. Answers questions on V-belt maintenance, inventory, wear. The Manheim Mfg. & Belting Co.

354 What's In a V-Belt?—Informative little 16-pp Booklet S-51105 describes raw materials used in producing V-belts. Natural and synthetic rubbers, cotton and synthetic cords, rubber chemicals and steel cables used in company's line are subjects for explanations of each material's role in the final product. Goodyear Tire & Rubber Co.

355 Cylindrical Roller Bearings — Multi-Row cylindrical roll neck bearings are described in 24-pp Form 436. Contains complete engineering and technical data on cylindrical roller bearings designed for heavy-duty service in roll neck mountings on hot and cold rolling mills. SKF Industries, Inc.

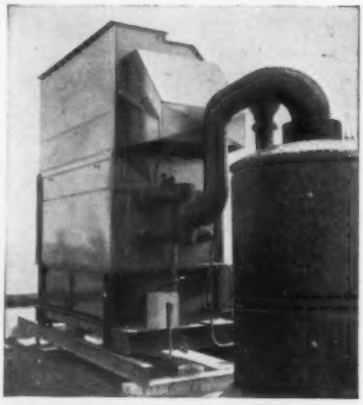
356 Power Transmission Machinery —Bulletin A-646A, 8 pp, contains data on company's power transmission machinery, including sheaves, sprockets, bushings, conveyor pulleys, couplings, speed reducers, clutches, bearings, take-ups, V-belts, collars, and steel transmission pulleys. Also described is a dry fluid drive. Dodge Mfg. Corp.

VIBRATION CONTROL

358 Improved Machine Mounts — This brochure describes advantages of company's leveling machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased machine mobility, reduce maintenance costs, lessen noise. Barry Controls, Inc.

359 Vinyl Machinery Mount—Advantages of company's vinyl machinery mount are outlined in this illustrated brochure. Installations are shown. Clark, Cutler and McDermott Co.

This AIR-COOLED CONDENSER *produces a* HIGHER VACUUM



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● Using air as the cooling medium, the Niagara *Aero* Vapor Condenser produces a higher vacuum than other type condensers, and with more enonomy of power and steam.

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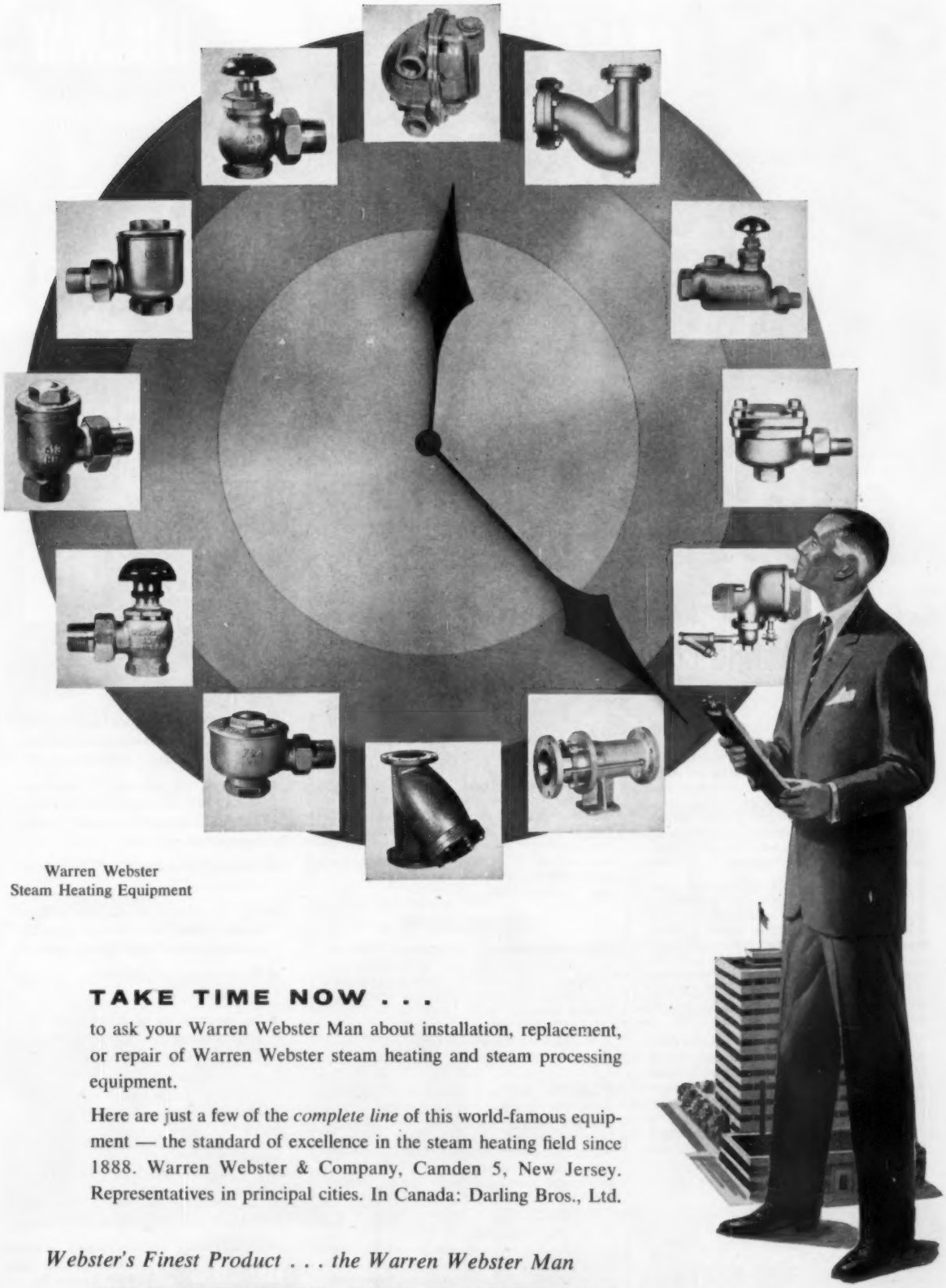

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Here are just a few of the *complete line* of this world-famous equipment — the standard of excellence in the steam heating field since 1888. Warren Webster & Company, Camden 5, New Jersey. Representatives in principal cities. In Canada: Darling Bros., Ltd.

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KURTH MALTING CO.
VIA RCA AUTO-DIAL

Twelve buildings make up the Milwaukee plant of Kurth Malting Company. Communication was hampered as the switchboard operator tried to handle all calls. Far too much time was wasted in legwork. The answer proved to be RCA Auto-Dial. Executive Vice President Walter Teipel, Jr., declares everybody's happy with RCA Auto-Dial because the whole working team feels closer together.

Kurth's RCA Auto-Dial internal telephone system includes ten executive master stations, allowing communication with the flick of a switch. When a call is not answered, a "signal" button pops out and remains out to indicate the call was made. Each station has a dial connecting it with all 58 RCA Auto-Dial phones throughout the plant. A paging system rounds out Kurth's RCA Auto-Dial.

You may be starting an RCA Auto-Dial or Sound System, or adding to existing facilities. Whichever, work with your RCA Engineered Sound Distributor. He's in your Classified Directory under "Sound and Public Address Systems" or "Intercommunication Equipment." And an RCA Sound brochure is yours for the asking. Write today!

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RADIO CORPORATION of AMERICA

SOUND PRODUCTS CAMDEN, N.J.

In Canada: RCA VICTOR Company Limited, Montreal

For more facts circle 671 on Reply Card

DATA FILE

(Begins on page 250)

SPACE, PROCESS HEATING

360 Plumbing, Heating Supplies—Edition H is the current edition of this company's 126-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated; gives sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

361 On Unit Heaters—Latest improvements, specifications and performance data for Herman Nelson horizontal and vertical unit heaters are covered in 36-pp Bulletin 700A. Includes complete hot water and steam performance tables, dimensions, selections, applications, descriptions of cabinets, elements, motor mountings, fans and accessories. American Air Filter Co., Inc.

362 Improved Space Heaters—Sixteen-pp Bulletin 564 introduces the Counterflo space heaters with induced draft Pyrojet burner designed to burn gas, light or heavy oil, or combination gas and light oil. Burner and other components are discussed. A large cutaway drawing shows construction and operating features. Specifications and dimensions provided. Dravo Corp.

363 Industrial Ovens—Thirteen types of company's Conventioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers. The W. W. Sly Mfg. Co.

364 Electric Heat, 101 Ways—Principal industrial heating applications and methods are described in "101 Ways to Apply Electric Heat," a 32-pp booklet. Illustrated case histories show how metal-sheather electric heating units are being used. Physical aspects of installation are detailed along with a discussion of the problem, solution and advantages. Edwin L. Wiegand Co.

LUBRICATION

365 Lubricating Greases — Bulletin 49 features two grades of greases developed for maximum lubrication under special bearing conditions—heavy loads, shock loads, and overloads. Uses, application methods, physical properties and benefits are detailed, and specifications are included. Sun Oil Co.

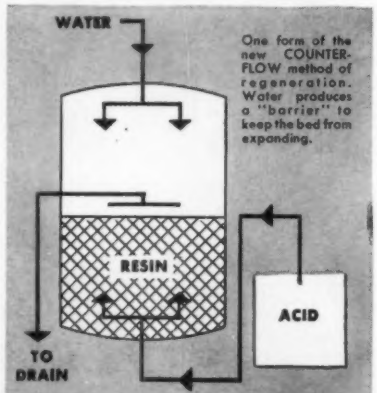
366 For Better Lubrication—Advantages of company's lubricants which are specially compounded for lubrication of reduction gear drives are outlined in pocket-sized folder. Features which assure smooth, trouble-free gear drive performance and lower maintenance costs are listed. Gulf Oil Corp.

367 Fundamentals of Wear—Vol. 42, No. 12 of this company's publication, "Lubrication," provides a 12-pp article on function of lubricants in reduction of wear and friction. Deals with phenomena associated with sliding, basic wear processes, interpretation of lubricant performance. The Texas Co.

ILLCO-WAY ionXchange

COUNTERFLOW*

REGENERATION OF ION-EXCHANGERS


WATER
One form of the new COUNTERFLOW method of regeneration. Water produces a "barrier" to keep the bed from expanding.
RESIN
ACID
TO DRAIN

* "COUNTERFLOW" is the trade mark of Illinois Water Treatment Company equipment utilizing a distinctly new principle of regeneration. Pat. pending.

- Ion leakage is reduced to about 1/3 of the amount common to conventional regeneration techniques.
- There is an increase of approximately 10% in cation resin capacity, with no increase in amount of acid regenerant.
- Removal of organics from the resin is improved.
- The possibility of calcium sulfate precipitation is decreased, permitting single-stage regeneration.
- Rinse water requirements are reduced.
- In systems using a two-bed deionizer ahead of a mixed-bed unit, ions can be removed more completely in the more efficiently regenerated two-bed unit, thereby reducing the load on the mixed-bed unit.

Present users of "COUNTERFLOW" are enjoying IMPROVED purity of effluent at LOWER cost of regenerant materials. One power plant, for example, is saving $16,000 a year on acid alone since converting existing de-ionizers to COUNTERFLOW design.

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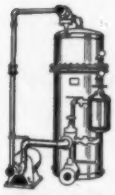
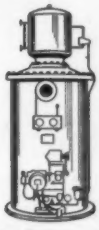
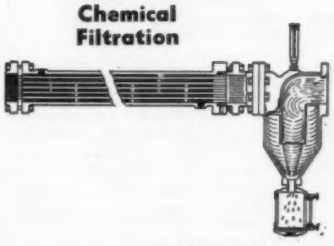


Chemical Filtration



Industrial Water Filtration



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MODEL 48MU210
48" 4-blade unit equipped with elbow

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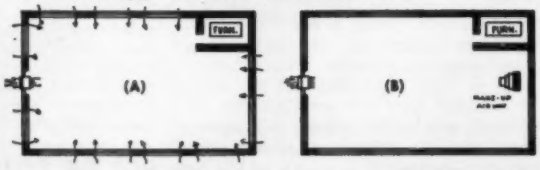
Performance of fans and ventilating equipment installed to exhaust from production and processing areas depends *entirely* upon the availability of ENOUGH AIR! Without sufficient quantities to replace air exhausted, the air-handling system is soon "starved," creating a negative pressure or "vacuum" condition which is responsible for infiltration of outside air around doors and windows. The effect of the resulting draft places an additional work load on the plant heating system, with an ultimate decline in temperatures throughout the working area.

here's a typical "MU" installation



Warm air, exhausted from a machine shop area, replaced by cold air pulled through cracks and door openings (A). Filtered and tempered air, supplied by Air Make-Up Unit installed in same area (B) helps to maintain constant temperatures; levels-off "peaks" and "valleys" in boiler or furnace loading.

New Aerovent Industrial Air "Make-Up" Units, designed to supply ample quantities of clean, pre-heated air, aid in maintaining peak fan performance, reducing drafts and in stabilizing uniform heating loads. Available in seven unit arrangements in sizes 24" to 54" for capacities to 33,000 CFM. Write for free Bulletin 850.

All Aerovent Fans are rated in accordance with the Standard Test Code and U.S.D.C. Comm. Std. CS178-51

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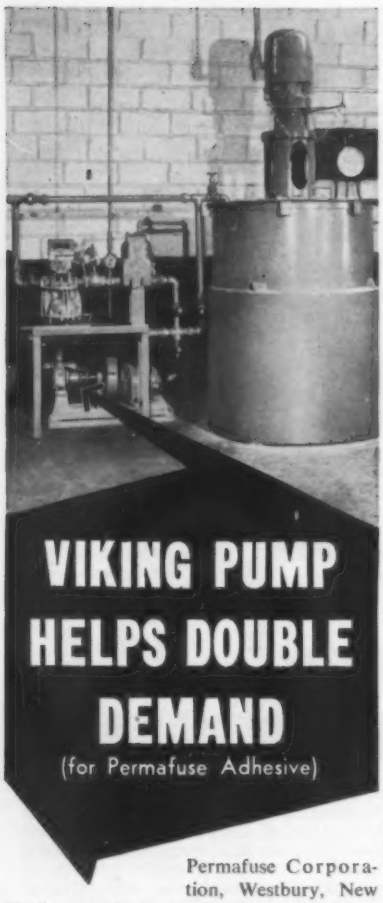

Permafuse Corporation, Westbury, New York, manufactures adhesives for bonding brake linings to brake shoes. With only one Viking J-152 Pump, Permafuse has produced such high quality adhesive that demand has doubled. So they'er adding a new heavy-duty Viking K-212 Pump that, with other equipment, will more than double production.

The Viking J-152 Pump does a variety of important jobs for Permafuse: 1. It pumps resins, synthetic rubber plasticizers, solvents and catalysts from drums and tanks to processing kettle. 2. It then circulates and blends materials for 24-hour periods. 3. After processing, the Viking Pump delivers adhesive through meter and filling machine into cans and drums.

Vikings can do multiple job pumping for you, too. For information, see your nearby Viking distributor, or write for bulletin 57Sz.

VIKING — the leader, not a follower, in Rotary Pumps

VIKING
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Cedar Falls, Iowa
In Canada, it's "ROTO-KING" pumps

See Our Catalog in Sweet's Plant Engineers File
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DATA FILE

(Begins on page 250)

PUMPS, COMPRESSORS

369 Continuous Flow Pump—Bulletin 30-C, 8 pp, outlines advantages of company's Moyno pumps which handle a variety of materials—from free-flowing liquids to non-pourable pastes, abrasives, solids. Describes principle of operation, discusses performance, construction, capacities, and includes specifications. Robbins & Myers, Inc.

370 General Purpose Pumps—Section B, 36 pp, describes rotary pumps for general purpose use. Explains positive displacement principle incorporated, gives suggestions for selecting proper materials of construction. Application and ordering information is provided on mounted and unmounted small pumps, large mounted pumps, pumps for operations requiring greater sealing, and large, totally enclosed models. Viking Pump Co.

371 Vertical Non-Clog Pumps — Catalog F-100 describes advantages of company's vertical non-clog pumps, designed for sewage disposal, underpass service and drainage, and for many applications in reduction plants and paper mills. Three different dry pit installations are shown, and a cutaway illustrating mechanical features included. C. H. Wheeler Mfg. Co.

372 Condensation Pumps—Eight-pp Bulletin 1403 describes company's line of condensation pumps for use in low and medium pressure-heating systems and steam-process equipment. Photos, drawings and other technical data on capacities and dimensions pertaining to construction, application and installation are included. Dunham-Bush, Inc.

373 Condensed Pump Data—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate unit, self-priming units, stainless steel pumps and high-pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, features. Goulds Pumps, Inc.

374 For Abusive Pumping Jobs—Catalog 4906, 36 pp, covers centrifugal pumps for wide industrial use and especially adapted to handling ashes, abrasive mixtures, slurries, hot and corrosive liquids. It describes several basic types; a horizontal shaft, single-stage side suction pump; a horizontal shaft, single-stage, rear-entrance automatic priming pump; vertical shaft pumps with standard, overhead and quill bearings for wet pit applications. Nagle Pumps.

375 Industrial Air Compressors — Twelve-pp Bulletin A-43 describes company's vertical design industrial air compressors supplying moderate amounts of air on a continuous 24-hr heavy-duty basis. Design features are described and illustrated by means of a cutaway view, and specifications and dimensions are tabulated. Joy Mfg. Co.

376 Air Cooled Compressors—Bulletin AC-15, 16 pp, shows a complete line of small, air-cooled compressors for industrial, and other use. Both one- and two-stage compressors are covered, with working pressures ranging from 85 to 175 psi. Complete specifications for each model are provided. Gardner-Denver Co.

377 Air Compressors — Catalog C-100, 30 pp, features comprehensive descriptive and engineering detail on company's line of air compressors, including electrical specification codes and instructions for ordering. Large cutaway view illustrates component features and tables list complete specification data. Distinctive design features are illustrated with cutaway photos and diagrams, and selection data is included. Curtis Pneumatic Machinery Div., Curtis Mfg. Co.

378 Portable Compressors—Twelve-pp Catalog GG-9A pictures 40 models of company's portable type compressors. A quick reference chart shows capacities, engine types, and mountings available. Illustrates such features as: replaceable cylinder sleeves, interchangeable valve parts, aircraft type compressor cylinders, heavy duty industrial type engines. Le Roi Div., Westinghouse Air Brake Co.

379 For On-the-Spot Air—Eight-pp Form 2302 features company's self-contained Spot-Air portable compressor. Deals with the many tools it will operate, with actual on-the-job illustrations pointing out added advantages of this light-weight compressor on jobs where bigger compressors are not needed. Ingersoll-Rand Co.

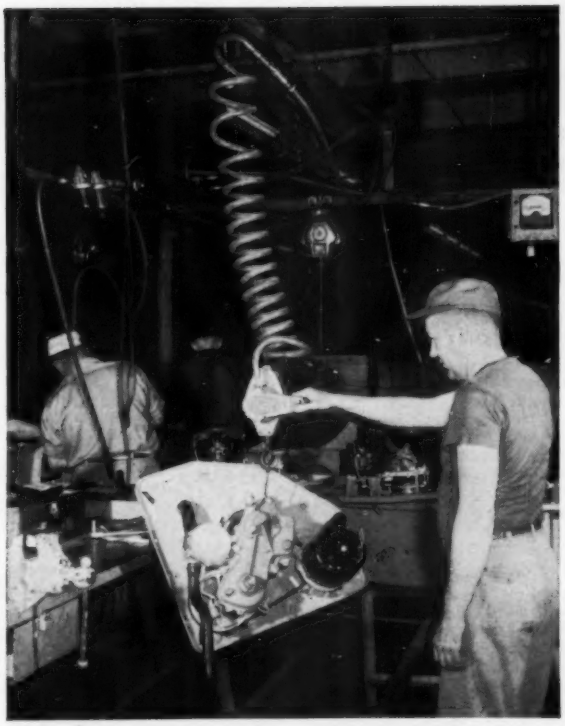
380 Industrial Compressors — Bulletin SSB-56 covers company's complete line of industrial air compressors from the ½ hp to 150 hp, including the accessories that go to make a complete installation. Photos of the various models are included, as well as specifications and dimensions. Schramm, Inc.

PACKINGS, GASKETS, SEALS

382 Teflon Products—Three bulletins present this company's Teflon packings, gaskets, special parts and stock. Bulletin CP522 describes Chempro lines of Teflon ring packing, Teflon impregnated asbestos packing, V-type packing and Teflon seal cage—for use with acids and strong chemicals. Bulletin CP553 covers Teflon jacket gaskets, solid ring gaskets, expansion joints and special gaskets. Bulletin CP554 illustrates special parts. Chemical & Power Products, Inc.

383 Improved Packings — Advantages of company's Chevron packings for rams, plungers and reciprocating rods are illustrated and described in 8-pp Catalog AD-115. Tables show general recommendations for packings against various pressures, approximate depths. The Garlock Packing Co.

384 Sealing Compounds—Twelve-pp Bulletin 7009 describes Titeseal, a group of sealing compounds, each designed for a specific purpose. Tells where Titeseal is used, how it is used, and how it acts to stop leaks and waste and prevent seizure of parts by rust and corrosion. Describes basic Titeseal blends. Radiator Specialty Co.

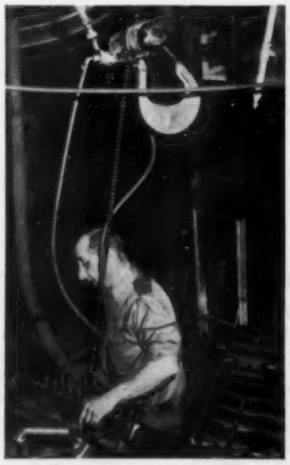


Keller Tool Model 86-A1 air hoist. Lifting capacity to 150 lbs.

Air can lighten your lifting jobs... and costs

Air power is changing the way of lifting. Here, Keller Tool one-hand air hoist removes a workpiece from the moving assembly line. After inspection the same hoist puts it back again—gently. There are many lifting jobs in your plant that a Keller Tool hoist can handle—profitably.

Keller Tool air hoists range in lifting capacities from 50 lb. to one ton. Let a Gardner-Denver representative suggest the hoist to fit your handling needs or write us directly for full details.



Husky Keller Tool air hoists start and stop all day long. No burned-out motor to stop production.

ENGINEERING FORESIGHT—PROVED ON THE JOB
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it moves the air...

"QUIETLY"

...whisper-quiet performance

Where noise adds to costly confusion you are wise to install whisper-quiet Propellair Type "QD" fans. The efficient air foil design of the rigid, precision balanced, cast aluminum propeller eliminates vibration noise and the sounding board effect of ordinary thin sheet metal blades. The special blade pitch delivers high volumes of air at quieter, lower speeds. Noise is further reduced by Propellair's steel venturi entrance ring. Powered by dependable, totally-enclosed Robbins & Myers motors, they are available in sizes from 12" to 36". Air delivery capacities from 1235 to 12000 CFM.

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DIV. OF ROBBINS AND MYERS, INC.
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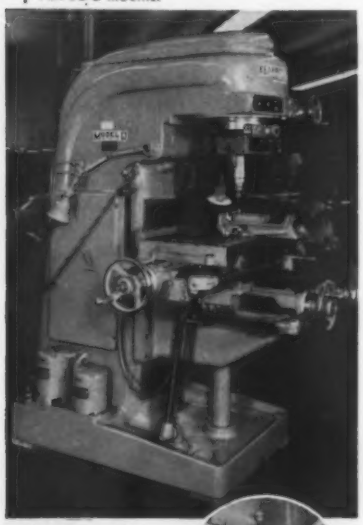
Kearney & Trecker milling machine installed at low cost on firm, high density AIR-LOC mounts.



Here's the VINYL vibration dampening mount

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- *Completely resists* oil, water, etc.
- *Reduces* transmitted noise & vibration as much as 85%.
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DATA FILE

(Begins on page 250)

BOILERS, GENERATORS

385 Hot Water Boilers — Catalog HCC-2, 20 pp, describes and illustrates design, construction, advantages and economics of company's controlled circulation hot water boiler for supplying high pressure, high temperature water for heating systems and process applications. Comparison of heat content—water vs steam—is included on table. Combustion Engineering, Inc.

386 Package Boilers — This 12-pp booklet on package steam generators describes the formulas behind all package steam generators, and illustrates how installation of a package steam generator can raise steam capacity in an existing boiler room without extensive structural changes. Cyclotherm Div., National-U. S. Radiator Corp.

387 Self-Contained Boilers — Bulletin AD-162, 8 pp, describes company's complete line of self-contained boilers for heating and processing steam or hot water. Design features and advantages are detailed and a cutaway view showing flow of air in the forced draft system is included. Cleaver-Brooks Co.

388 Preheating Combustion Air — This well-illustrated 36-pp booklet explains fuel savings and increased performance made possible by using waste heat in flue gases to preheat incoming combustion air. Also covers increased boiler output, ability to use lower grade fuels. Air Preheater Corp.

389 Packaged Generators—This 16-pp catalog describes a series of packaged steam generators in sizes from 10,000 to 46,000 lb of steam per hour. Gives capacities, dimensions, construction features. Instrumentation is discussed. Illustrations include sectional drawings and installation photos. Booklet also provides a selection chart on firing equipment and controls. Foster Wheeler Corp.

390 Shop Assembled Boiler — Sixteen-pp Bulletin G-76 completely describes and illustrates company's Type FM water-tube integral-furnace boiler, made in standard sizes from 2900 to 28,000 lb of steam per hr, pressure to 250 psi. The Babcock & Wilcox Co.

INSULATION

391 Piping Insulation — Seven-pp Bulletin SO 1054 features a snap-on, one-piece molded pipe insulation of fine glass fibers for hot or cold piping. Specifications are given for industrial, commercial, and institutional piping where maximum efficiency is of importance and for hot water and low pressure steam. Gustin-Bacon Mfg. Co.

392 Insulation Specifications — This set of six specifications covers application of Foamglas insulation for industrial equipment and piping. Each booklet contains tables of suggested thicknesses of insulation to be applied, drawings of installation procedure, supports, and recommended finishes. Booklets are devoted to low-, medium-, high-, and dual temperature equipment and piping, to underground piping, and spheres. Pittsburgh Corning Corp.

VALVES, TRAPS, PIPING AND ACCESSORIES

393 High Pressure Valves—Bulletin B-451, 12 pp, contains complete engineering data on company's valves for high pressure and high temperatures. Typical installations are pictured, dimensions and weights are tabulated, and temperature-pressure ratings are shown. Yarnall-Waring Co.

394 Industrial Valves—Bulletin 507V illustrates and describes company's line of industrial valves for control of air, gas, liquids and solids. Features photos and descriptive detail on a variety of valves, including butterfly valves, wafer butterfly valves, slide valves, check valves. W. S. Rockwell Co.

395 PVC Valves, Fittings—This 16-pp bulletin describes polyvinyl chloride valves and fittings offering resistance to most salts, alkalis and acids. Bulletin provides application tables on performance of normal impact PVC valves and fittings for handling 315 fluids. Cutaway drawing and text detail design features for long-time control of corrosives. Tables show physical properties. Walworth Co.

396 Valve Performance Facts—Included in this 36-pp booklet are 32 case histories of cost-saving valve installations. Service applications covered include steam, oil, water, coating fluid, chlorine, phenol, pulp stock, vacuum, others. Industries include paper mills, refineries, central stations. Crane Co.

397 For Valve Selection—Circular 555, 24 pp, is designed as a guide for selecting valves, boiler mountings, and lubricating devices, including the LQ600 bronze globe valves. Luncor PVC all-molded valves, and solder end valves. Tables, technical data and information on the selection of valves, boiler mountings, and lubricating devices are completely indexed for easy reference. The Lunkenheimer Co.

398 Corrosion Resistant Valves — Eight-pp Bulletin 8 provides engineering specifications and a discussion of the advantages of Aloyco 20 valves. Basic types and adaptable features of these corrosion resistant valves are presented. Includes data on corrosion tests on this metal with various concentrations of sulfuric acid. Alloy Steel Products Co.

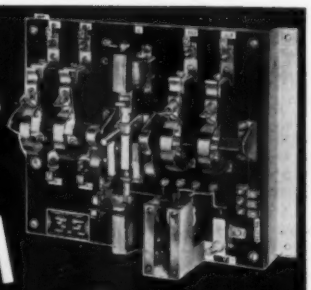
399 Valve Digest—Form 197R is a valve catalog digest furnishing the latest coverage of the OIC bronze, iron, cast steel, forged steel, and lubricated plug valve lines in a condensed form. Valves are classified by type and pressure class, and illustrated; this edition also includes face to face dimensions for each size and type of valve listed. The Ohio Injector Co.

400 On Lubricated Plug Valves — This 12-pp illustrated manual covers function of lubricants in lubricated plug valves and the essential properties

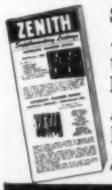
FOR POWER THAT'S ALWAYS ON THE JOB

use

ZENITH AUTOMATIC TRANSFER SWITCHES



Zenith Automatic Transfer Switches assure full protection against *any* failure of regular voltage. Transfer to emergency power in a fraction of a second is automatic at 70% of line voltage. Regular power is restored at 90% of line voltage.



Simple design . . . sturdy construction . . . switches lock mechanically through trouble-free toggle action . . . no springs, latches or delicate mechanisms.

Available electrically or mechanically held, 30 to 400 amps.

Send for free catalog on complete Zenith line.

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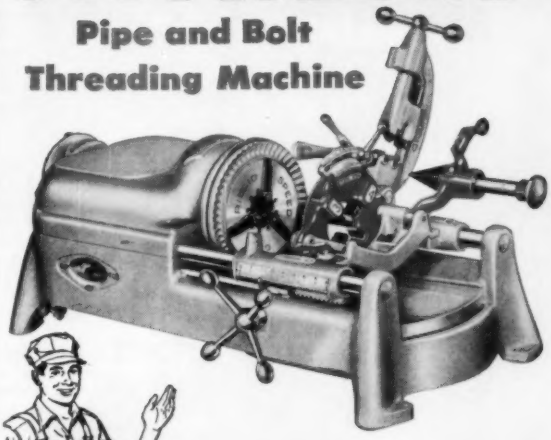
New 535 RIDGID

Pipe and Bolt Threading Machine



with 1 Universal Die Head and 2 sets of Pipe Dies ½" to 2"

The Complete Package **$460.00** (slightly higher in Canada)

Your best buy for fast easy pipe work . . . by power

Full range of pipe and bolt dies for universal head available

Complete machine, including Speed Chuck guaranteed to grip tight any pipe or conduit, forward, reverse . . . 1 universal quick-opening die head that adjusts to size right in machine, with 2 sets of dies, one for ½" and ¾", one for 1", 1¼", 1½", and 2". Roll type cut-off with self-centering full-floating cutter wheel . . . Five-Flute cone reamer, ⅛" to 2" . . . *Above 3 tools operate independently, swing up out of way when not in use, so pipe can be chucked from front* . . . Powerful 115/120 volt universal motor . . . All 500 and 500A die heads and accessories fit this 535 machine . . . See all the other RIDGID efficiency features of this remarkable 535 at your Supply House!

You can't afford to thread, cut and ream pipe by hand!

The Ridge Tool Company, Elyria, Ohio, U.S.A.

RIDGID Work-Saver Pipe Tools

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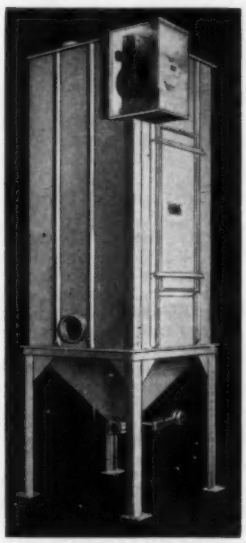
RUEMELIN *Dust Control* EQUIPMENT



Vacuum Type Dust Filter with Electric Bag Shaker.

Ruemelin Dust Filters achieve a high rate of efficiency in the control of fine dusts. Our tubular bag design provides —

- Low resistance to air flow.
- Thorough shaking of bags while fan is shut down. Eliminates tautness.
- Maintenance, inspection and replacement of tubes made easy by our patented design.

Ruemelin Filters collect and suppress dust created in the Ceramic, Glass and Pottery fields, enameling plants. Single compartment or continuous type units for capacities from 250 cfm to 30,000 cfm. Over 3000 collectors in service. Write for bulletin 24-D.

RUEMELIN MFG. CO.

3988 N. PALMER STREET MILWAUKEE 12, WIS., U. S. A.

MANUFACTURERS AND ENGINEERS — SAND BLAST AND DUST COLLECTING EQUIPMENT — WELDING FUME COLLECTORS

A 7661-¼R

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DEFIES HEAT
ABRASION...
FATIGUE...
LEAKS
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DATA FILE

(Begins on page 250)

of an effective lubricant. Detailed information on how to select the right lubricant and how to apply it is presented in text and pictures. Charts list flow materials which plug valves service, recommended lubricant number, service range and temperature range. Walworth Co.

401 Steam, Air and Gasoline Traps—Catalog 751, 32 pp, is a trap ordering book with capacity tables, installation diagrams, and containing charts and formulas for determining proper size trap for specific applications. Covers thermostatic steam traps, expansion steam traps weight-operating traps. W. H. Nicholson & Co.

402 Swivel Joints—Catalog G-4, 32 pp, covers this manufacturer's line of ball-bearing swivel joints as well as other products, including loading racks, manifolding lines, all-metal hose. In addition to providing dimensional and operating data on products, booklet is well illustrated. Chiksan Co.

FILTERING

404 Filters, Strainers—Industrial Catalog 1054, 48 pp, provides application and engineering information on company's line of micro-filters and precision strainers. Fuel filters, full flow and by-pass lube filters, air separators, and metal edge strainers for fuel lube and industrial use are also presented. Purolator Products, Inc.

405 Air Filters—Eight-pp Bulletin 117 describes advantages of company's Poro-Stone air filters for compressed air lines. Typical applications are illustrated and described, and operating details, capacities and dimensions given. Aftercoolers and cyclone separators are also covered. R. P. Adams Co., Inc.

406 Filter Guide—This 8-pp general bulletin illustrates six major filter types for industrial applications: disposable media gravity type, combination gravity and magnetic, straight magnetic vacuum, pressure and screen-type settling filters. Applications covered include all types of fluids from water to heavy viscosity oils. Descriptions of filter operation are given as well as applications. Industrial Filtration Co.

407 Data on Filters—Provided in this general catalog are product bulletins covering company's Staynew line of filters. These include intake filters, pipe line filters, liquid filters, hydraulic filters, automatic filters, dry panel filters, viscous panel filters, others. Catalog is available to qualified plant engineers. Dollinger Corp.

MATERIAL HANDLING

409 For Overhead Handling—Booklet 2008-M, 12 pp, is replete with illustrative material on principal components of overhead handling systems. Track design and advantages of supporting it flexibly are described, and formulas and figures for comparing various track sections are included. Among subjects covered are various carriers for hand, electric and automatic operation; tractors; track switches; standard cranes, and transfer cranes. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

410 How to Choose a Crane—Designed to aid in the selection of overhead cranes, 8-pp Unit 79 shows how to analyze handling problems, decide on the type of crane desired and draw up specifications for crane proposals. Basic data is provided on classes of crane service, crane ratings and capacities and recommended speeds for bridge, trolley, hoist. Whiting Corp.

411 Steel Conveyor Belts—"A profitable approach to the selection of steel processing conveyor belts" is the subject of this 16-pp bulletin. Simplified selection, standard specifications, and installation information are included. Photos and diagrams illustrate the text. The Colorado Fuel and Iron Corp.

412 Conveyor Belt Chart — Engineering data for standard conveyor belt construction is given in this chart and accompanying sheets. Strength characteristics of eight popular ply and material combinations of conveyor belt constructions given. Quaker Rubber Corp., Div., H. K. Porter Co., Inc.

413 Cost-Cutting Materials Handling—"The How Book of Cost-Cutting Materials Handling," is a 24-pp booklet covering various phases of the materials handling problem and their effect on industrial production. Text and pictures cover such subjects as fundamental handling motions, advantages of planned material handling practices, analysis of handling organization, collecting handling data, diagramming travel. The Yale & Towne Mfg. Co.

414 Handling Cost Cutter — Bound in loose-leaf style, the Materials Handling Cost Cutter tells how mechanized materials handling can cut handling costs in a variety of jobs and industries. Case histories of actual applications are cited, equipment and methods described, and a list of trucks and attachments "keyed" to the particular job and field. Profusely illustrated. Automatic Transportation Co.

415 Heavy Duty Electric Hoists—Bulletin 142-G, 24 pp, contains illustrated data on company's line of heavy duty electric hoists, including lug suspension, hook suspension, with plain trolley, with geared trolley, with motor driven trolley, and the 5-ton capacity models. Advantages are detailed and component parts illustrated with photos, drawings and diagrams. Specifications included. Chisholm-Moore Hoist Div., Columbus McKinnon Chain Corp.

416 Chain Hoists—Catalog 61, 20 pp, describes construction and design features of company's multiple gear chain hoists, with a large cutaway view showing component parts included. A table of dimensions is given, as well as dimensional diagrams, shipping information, parts list prices and other pertinent data. Reading Crane & Hoist Corp.

417 Electric Hoists—Twelve-pp Bulletin DH 133B describes Speedway electric hoists of 500- to 4000-lb capaci-

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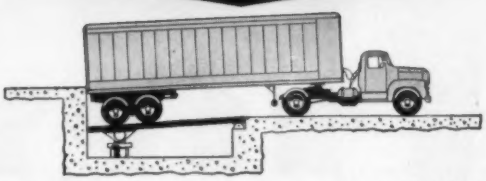
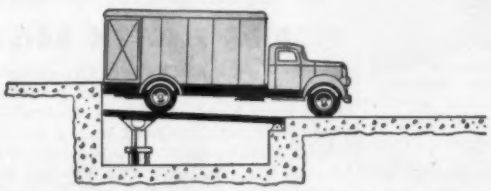


High truck beds are lowered to dock level



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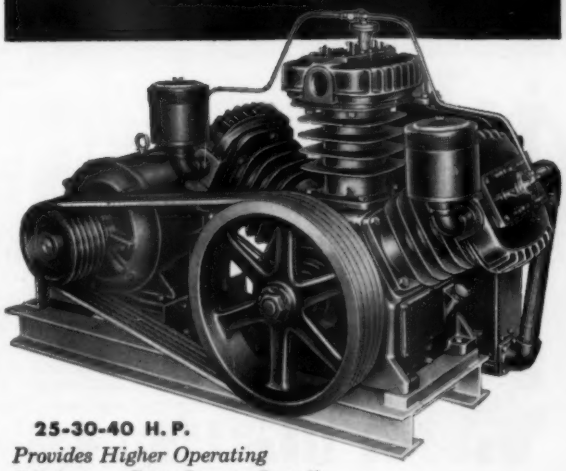

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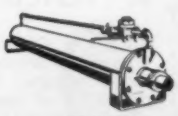
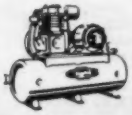


AIR HOISTS AIR CYLINDERS



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PACKAGED AND REMOTE AIR CONDITIONING

CM-21

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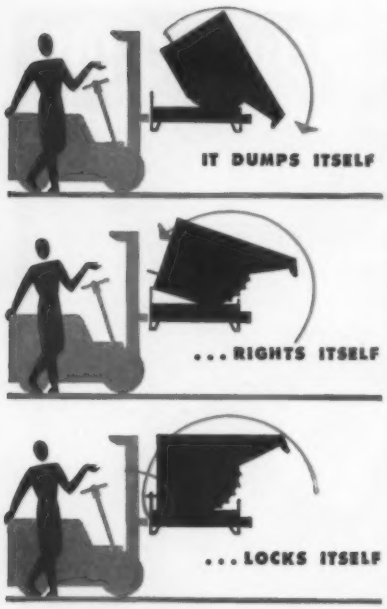

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DATA FILE

(Begins on page 250)

ties. Fully illustrates and explains design features and gives details on suspensions and conducting systems. Clearance data included. Wright Hoist Div., American Chain & Cable Co., Inc.

418 For Materials Handling—Bulletin SE-IMH-1 describes a few of the advantages of company's machinery for handling a variety of industrial lifting and loading jobs. Illustrations of typical applications are included. Bucyrus-Erie Co.

419 Oil-Hydraulic Lifts — Catalog RE-203, 20-pp, covers the field of heavy-duty oil-hydraulic lifting devices for industrial applications. Featured in catalog are company's standard Levelator lifts, a 6000 lb single-jack model and a 12,000 lb dual-jack lift. Also featured is an electric pump mounted on an oil tank. Rotary Lift Co.

420 Adjustable Ramps—Engineering details and other information on use and installation of company's hydraulic adjustable ramps for loading docks are featured in this illustrated bulletin. Two types of dock equipment are treated—the Adjust-A-Dock, installed in the loading platform or at its level, and the Adjust-A-Truck, installed at ground level. Rowe Methods, Inc.

421 Self-Dumping Hoppers—Bulletin 255 describes self-dumping hoppers reported to cut cost of hand unloading at least 50 per cent. Details rugged construction of the units, safety catch incorporated, other features. Standard models are pictured, as are some typical jobs handled. Roura Iron Works.

422 Electric Freight Elevator—Bulletin A-414, 12 pp, contains design and operation information on company's plunger electric freight elevator designed for low-rise, light and heavy duty freight handling requirements. A sectional diagram points out component parts, and an installation diagram and sizes included. Otis Elevator Co.

423 Pneumatic Conveying — Actual operation of the Airveyor, as used in the pulp and paper mill industry for handling process chemicals, chips, sawdust and hog fuel, is described in 12-pp Bulletin A-17. Typical installations are described, with schematic drawings and photos of each included. Fuller Co.

424 Automatic Bulk Handling—Bulletin 530, 32 pp, on Airstream conveyors, presents information showing how pneumatic conveying has solved many bulk handling problems. System diagrams of typical installations point out applications and flexibility of conveyors. Over 70 illustrations show how air transports granular or powdered bulk material. Dracco Corp.

425 On Chain Block Safety—This wall chart illustrates safe handling of chain blocks. Sketches cover nine principles of handling, showing what should always be done and what should never be done. Reverse side of the chart gives data on company's line of chain blocks and trolleys. Shaw-Box Crane & Hoist Div., Manning, Maxwell & Moore, Inc.

426 Casters and Wheels—This 192-pp manual, Number 60, contains detailed information on a line of casters and wheels designed for a variety of furniture and equipment applications. Dimensional data, specifications and price lists are provided for furniture and industrial casters and wheels, and photos, drawings and diagrams illustrating design and construction features are included. Darnell Corp.

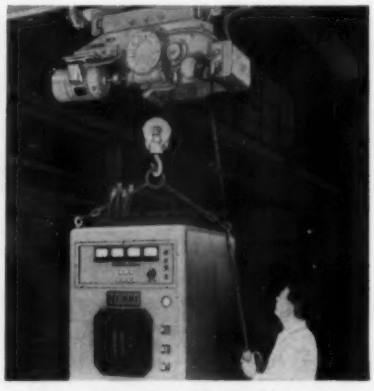
WATER TREATMENT

427 Mixed-Bed De-Ionization—Practical equipment for mixed-bed deionization at flow rates of 5 gal per hr to 5000 gpm is described in this 8-pp illustrated bulletin. Advantages of the mixed-bed de-ionizer are detailed. Illinois Water Treatment Co.

428 Feedwater Treatment—Process Bulletin B1, "Treatment of Boiled Feedwater by the Direct, or Indirect Method," discusses advantages of direct treatment, as a complete treating program or as a supplement to external systems. Explains why direct treatment is convenient, economical, and complete. National Aluminate Corp.

INSTRUMENTS, CONTROLS

430 Economy of Metering—Bulletin NI-57 contains 12 pp of cost-saving



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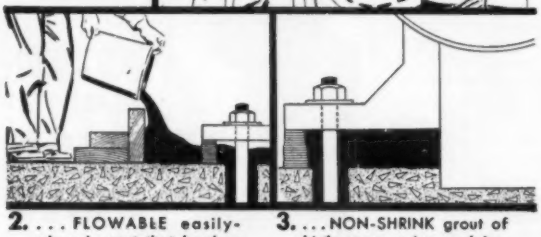

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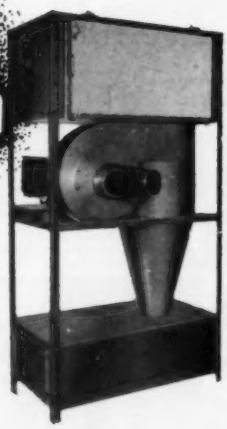

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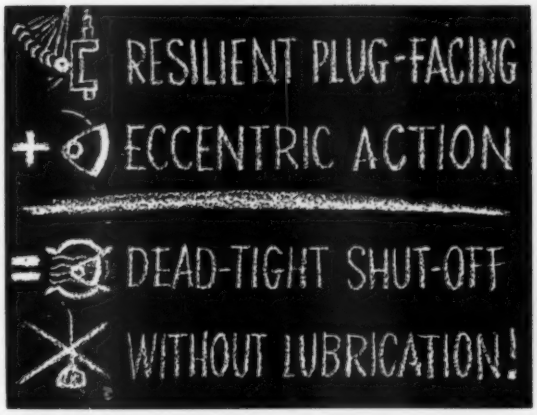

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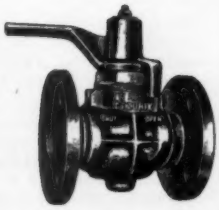

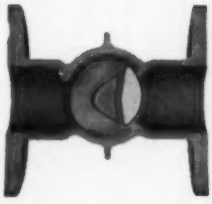

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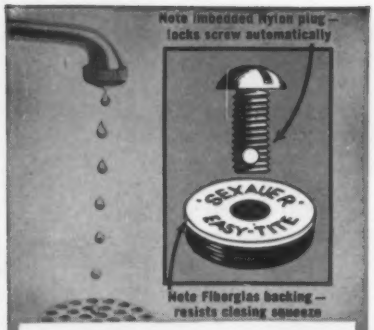
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DATA FILE

(Begins on page 250)

metering information, including a number of case histories. Also described are various meters and registers, maintenance rules, installation suggestions, and results of surveys in food and the chemical processing industries. Neptune Meter Co.

431 Pneumatic Drive Units—Bulletin 1033 describes pneumatic power drive units for remote operation and positioning of valves, dampers, louvers, rheostats, vanes and variable-speed drives. Explains principle of operation, and gives mechanical specifications, table of sizes, torque ratings and weights, torque output curves. Copes-Vulcan Div., Blaw-Knox Co.

432 Versatile Electronics—How flexibility of electronic temperature controls makes them useful in a wide range of heating and air conditioning installations is explained in this 16-pp booklet, Bulletin SA-2681. Purpose of publication is to fill the gap between the theory of electronic bridge circuits and specific control layouts and circuit diagrams. Four basic features that give flexibility are described. Minneapolis-Honeywell Regulator Co.

433 For Limited Panel Space—Bulletin 532 describes Model 216 indicator used with company's automatic tank contents gage. Bulletin contains a full illustration of indicator which, although occupying a small space, has a scale 20 in. long. The Liquidometer Co.

Reader Service Cards for ordering catalogs are on pages 245-246. Be sure to include your name, job title, and company.

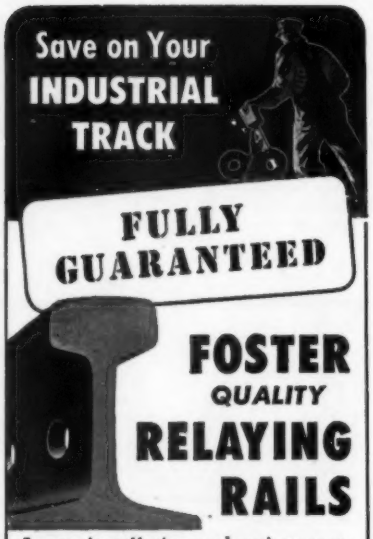
435 Temperature Controls—Eight-pp Catalog CC, on temperature controls and allied equipment for heating and refrigeration, provides information on recording, indicating non-indicating controls; thermometers; bulb installation accessories. The Partlow Corp.

ELECTRICAL

436 Totally-Enclosed Motors—Bulletin 500-A describes company's totally-enclosed, fan-cooled motors in ratings from ½ to 40 hp. Ratings and dimensions listed. Robbins & Meyers, Inc.

437 Enclosed Switches—Catalog 83, 28 pp, and Catalog 101, 20 pp, describe enclosed switches for industrial uses. Included are general switches designed for use on either a-c or d-c applications, sealed switches, heavy-duty limit switches, hand operated switches, and maintained-contact switches, all of which are available in a variety of actuator designs, contact arrangements. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

438 Air Interrupter Switch—Bulletin 100, 8 pp, provides full details on company's high voltage air interrupter



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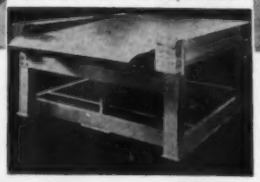
Model MFL 20,000-lb. capacity, 6' wide, 8'8" long, front to back with 24" vertical adjustment



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■ Now it is possible to obtain the cost-saving benefits from permanent hydraulic dock leveling devices without costly installation charges. These new Rowe models, with capacities of 10,000 and 20,000 lbs., are completely assembled ready for placement in front of an existing dock.

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PUMPS FOR ABRASIVE AND CORROSIVE APPLICATIONS

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DATA FILE

(Begins on page 250)

switch. The comprehensive description includes case and cutaway photos, multiple position illustrations, dimensional drawings, typical specifications and examples of built-in installations. Cutaway photos illustrate three front-operated types available and photos of installation procedure included. Continental Electric Equipment Co.

439 What You Should Know About Circuit Breakers—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, in-rush current effects. Heinemann Electric Co.

440 Secondary Unit Substations — Bulletin 9004-A, 20 pp, describes lower cost, complete flexibility and space saving of secondary unit substations. Photos and charts of construction are provided, also standard KVA ratings covering all types of indoor and outdoor substations. I-T-E Circuit Breaker Co.

441 Electrical Equipment Digest — Electrical equipment illustrated and described in 138-pp Catalog Digest 139, includes load centers, circuit breakers, low voltage control, fusible service equipment, interchangeable hubs, meter equipment and accessories, meter sockets and troughs, safety switches, panelboards, duct and fittings, starters, magnetic breaks, relays, contractors other equipment. Square D Co.

442 Trolley Busway Systems—Three bulletins offer real help on electrical installations involving cranes and hoists, assembly and production lines, moving test lines and other moving electrical equipment. Bulletin 35 (28 pp) covers 225-500 amp systems; Bulletin 50 (44 pp) 100 amp systems; Bulletin 45 (40 pp) 60 amp systems. Each includes special sections on installation planning and procedure, methods of mounting. Feedrail Corp.

443 For High Voltage Cable—Test results and service records on an improved butyl rubber compound for high-voltage cables are announced in 12-pp Bulletin EB-27. Covers resistance to ozone, operating temperature, high-voltage, dielectric strength, aging, insulating resistance, mechanical moisture absorption, electrical moisture absorption, capacity and power factor. Anaconda Wire & Cable Co.

444 Cable Troughs—This 12-pp catalog offers a simple solution to any design problem of change of direction or elevation with a complete set of standard fittings, horizontal elbows, inside and outside vertical elbows, ties, crosses, covers and many special fastening devices to save time and labor. Contains full instructions for installations, load charts. The Globe Co.

445 Power Lighting Cable — Bulletin RR-10 describes company's Type RR-10 cable for power and lighting

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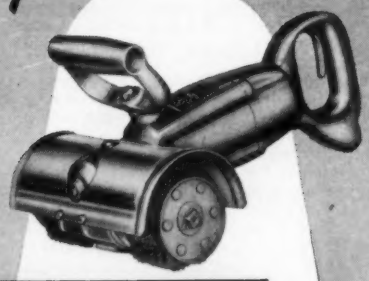

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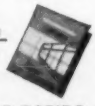

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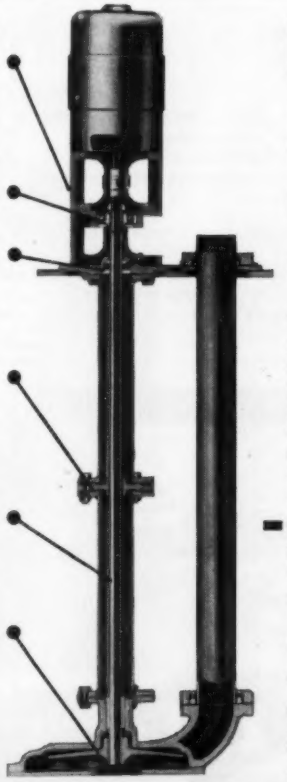

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DATA FILE

(Begins on page 250)

service. Technical characteristics of direct buried, aerial or conduit installations and sheaths are included, as well as tabular data giving physical dimensions. Triangle Conduit Co., Inc.

446 Aluminum Conduit Fittings — To fulfill the need for electrical equipment made of materials which resist corrosive attack of many chemicals destructive to ferrous or standard aluminum equipment, Bulletin 2681 presents a broad selection of Condulets and related equipment utilizing copper-free aluminum alloy in their construction. It includes Condulets, lighting fixtures, plugs and receptacles and others. Crouse-Hinds Co.

447 Battery Users Manual—Motive-power battery maintenance and repair is detailed in this newly revised edition of company's Battery Users Manual (Bulletin GB-1599A), 44 pp. Developed as a result of in-plant training courses, this book is designed to enable plant engineers to conduct an organized battery training course in their own plants. Encompassing maintenance, repair and selection, this reference book includes over 60 photos. Gould-National Batteries, Inc.

448 Testing Instruments — Bulletin 19-56, 16-pp, features company's electrical testing instruments, including ohmmeters, ground testers, dielectric test sets, motor rotation tester, cable fault locating equipment, transformer turn ratio test sets, corona test equipment, frequency meters, tachometers, others. Includes photos and descriptions of each type, including chief features. James G. Biddle Co.

449 Wires and Cables—Interlocked armored cable, supports and fittings designed for low cost, heavy duty industrial, power or control wiring are described in this 24-pp bulletin. Photos and specific descriptions of various types of armored cables available for voltages through 15,000 v, single and multi-conductor are included. Arranged in table form are dimensional data. National Electric Products Corp.

450 High-Capacity Fuses — Form HCS, 6 pp, describes fuses of unlimited interrupting capacity on voltages to 600, designed to afford protection for loads of 600 to 5000 amp. Includes test data, charts on opening time, current limiting effect. Bussmann Mfg. Co.

451 Commutator Slip Ring Maintenance—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their corrections; brushes; general maintenance. Ideal Industries, Inc.

452 Asbestos Insulation — "Specifications for Asbestos Varnished Cambric N.E.C. Type AVA Lighting Wire and Power Cables." 8 pp, establishes performance tests for asbestos insulation applied as a felted wall in combination with varnished cambric tapes for wires and cables with 600 and 1000 v ratings. Rockbestos Products Corp.

453 Flexible Cords — This well-illustrated 24-pp booklet includes all new Underwriters classifications for flexible cords manufactured by this company. Featuring data on Dynaprene and rubber jacketed cords as well as braid covered types, also gives tips on selection. Whitney Blake Co.

LIGHTING COMMUNICATION

455 Architectural Floodlighting — Eight-pp Bulletin GEA-6437 illustrates various methods of floodlighting industrial plants, public and commercial buildings and others. Provides information on general purpose heavy-duty floodlights. Also contains tips on floodlighting of vertical surfaces. General Electric Co.

456 Outdoor Mercury Lighting — "How Mercury Vapor Outdoor Lighting Brings More Night Action." 8 pp, stresses low cost and versatility of mercury vapor lamps. Shows their uses in industrial areas, parking lots. Sylvania Electric Products, Inc.

457 Illumination Design Data—Basic reference data on interior lighting installations is contained in 48-pp Manual A-4854, which features a section describing footcandle levels required for each group of seeing tasks. These

Ilg CRF roof ventilators give long life with minimum service, thanks to direct-connected motor that eliminates belts and pulleys.

Easy installation is assured by "unitized" construction of fan, motor and housing. Ideal for single or multi-story buildings, large or small duct systems.

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PRE-EMPLOYMENT DISABILITY EVALUATION

Detailed Policies Regarding Applicants Applying for Employment with Special Reference to Various Disabilities

By

WILLIAM A. KELLOGG, M.D., F.A.C.S.

Formerly Clinical Professor of Surgery New York Polyclinic Post-Graduate Medical School

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- **To protect the employee against further injury**
- **To protect the employer from increased compensation costs**

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John Richelieu Davis—**INDUSTRIAL PLANT PROTECTION.** Pub. '57, 620 pp., 175 il., Cloth, $12.00.

B. W. Gocke—**PRACTICAL PLANT PROTECTION AND POLICING:** For the Security of Business and Industry. Pub. '57, 144 pp., (Police Science Series), Cloth, $4.50.

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LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

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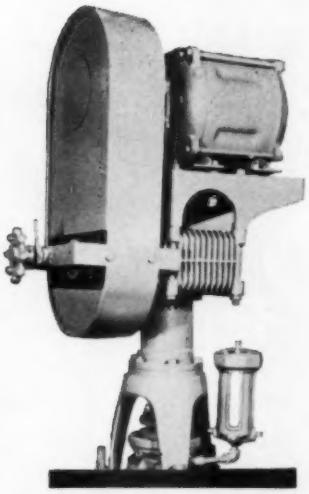
NEW, powerful drive increases agitator range



Your process agitator will handle a wider range of operating conditions with Pfaudler's *new* Type "W" Drive.

In addition, this compact new unit leaves surrounding areas more accessible. The vertical assembly eliminates cumbersome supports.

Carries greater loads. This new drive handles heavier loads than any other type of comparable worm gearing. It has a "throated" design—both gear and worm teeth have convex arc shapes—which permit more teeth to mesh simultaneously.

More compact. The motor is mounted out of the way *above* the drive. This eliminates angular bracing from reactor top head, permitting a greater number of top-head openings. All are more accessible and give great flexibility to top-head layout—particularly valuable features on small vessels. (Side mounted motors available where headroom is limited.)

Hydraulic, explosionproof drives available. When you want 100% explosionproof construction and wide, variable-speed range, you can specify hydraulic drives. These can be supplied at the factory or existing drives can be converted in your plant, by substituting a hydraulic motor.

The new drive can also be furnished with double-reduction gearing and flange-mounted motor. This provides a totally enclosed gear drive with agitator speeds from 525 to 7.3 RPM in 27 increments.

Complete flexibility. You can use the new "W" Drive with stuffing box or mechanical seal. Standard 2.5W, 3W, 4W, and 5W Drives are equipped with constant speed sheaves with static-free belts that can be combined to give any required speed for agitation you desire. For complete data on design and performance, write for Bulletin 951.

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Please send Bulletin 951 describing your Type W Drives.

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DATA FILE

(Begins on page 250)

footcandle levels are then related to many kinds of rooms and areas. A chapter on interior lighting design describes ways of calculating quantity of light. Westinghouse Electric Corp.

458 Industrial Lighting — Designed to be inserted in company's lighting catalog, these two data sheets describe application, construction, installation and wiring details of two types of lighting units. Section 30, Sheet 20 features all-porcelain industrial units and Section 30 Sheet 18 covers vapor-tight units. Day-Brite Lighting, Inc.

460 Closed-Circuit TV — Catalog PD-500 describes features and applications of company's self-contained closed circuit television camera. Specifications and mechanical dimensions are also covered. General Precision Laboratory Inc.

461 Television Equipment—Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

462 Inside Telephone System—"Ten Ways To Cut Costs With Inside Telephone" is a 12-pp illustrated booklet which tells how ten different organizations are saving money with P-A-X. Explains the role of this telephone system, separate from the public telephone service, in stepping up production, saving man hours, cutting costs, improving customer relations, and effecting further company benefits. Automatic Electric Sales Corp.

OTHER EQUIPMENT

465 Draft Starter—Capacity data for Quickdraft units are presented in 8-pp Form QF-SD. Seven capacity tables provide means for determining capacity of standard units when installed under hundreds of different conditions. An insert pictures and describes installations. Quickdraft Co.

467 Insect Control—Featuring manufacturer's insecticides and insect control equipment, this practical 36-pp booklet provides excellent tips on the control of industrial insects. More than 60 pests are pictured along with specific information on where they are found, identifying features, extent of damage, life stages and cycles, characteristics of existence, and recommended control measures. Ten insecticides detailed. West Disinfecting Co.

468 Reproduction Materials — Provided in this 20-pp illustrated booklet on Kodagraph reproduction materials is a comprehensive materials selection chart designed to aid in finding material best suited to any reproduction job, from printed halftones, mircrofilm, and drawings with fine detail to soiled drawings and those in bad condition. Rest of booklet presents company's films, papers. Eastman Kodak Co.

469 The Wire Story — This 72-pp illustrated catalog describes company's line of wire for industrial applications. Gives complete ordering specifications for all wire, including low carbon coarse wire, high carbon fine and specialty wire, low carbon fine and specialty wire, and flat and shaped wire. The Colorado Fuel and Iron Corp.

471 Industrial Finishing Equipment —Catalog A-657, 12 pp, describes a complete modern finishing system for cleaning, rust proofing, drying, painting and finish baking operations. The R. C. Mahon Co.

473 Metal Cleaning, Finishing—Principles of metal cleaning are discussed in this 24-pp illustrated catalog. A variety of metal cleaning and finishing machinery is described, including conveyor type cleaning machines, monorail type cleaning machines, drum type machines. The Cincinnati Cleaning & Finishing Machinery Co.

474 Corrosion Keys for Aluminum—This brochure is intended primarily as an aid to engineers designing aluminum into process plants or equipment, although it will interest those with other applications of the metal. It makes use of graphs which tell at a glance the yearly corrosion rate of more than 100 chemicals and other corrosive materials on aluminum. The Reynolds Metals Co.

475 Corrosion-Resistant Seals — Eight-pp Buletin 938 describes corrosion-resistant seals and stuffing boxes for E, P, and R series vessels, stressing their interchangeability. Discusses five conditions to be considered in selecting best method for closing the opening between agitator and top of reactor. The Pfaudler Co.

476 Standard Storage Tanks—The broad scope of services to which company's standard storage tanks are put is covered in this 20-pp catalog. Such qualities as versatility and economy are stressed, and typical installations are pictured. Engineering standards given. Graver Tank & Mfg. Co., Inc.

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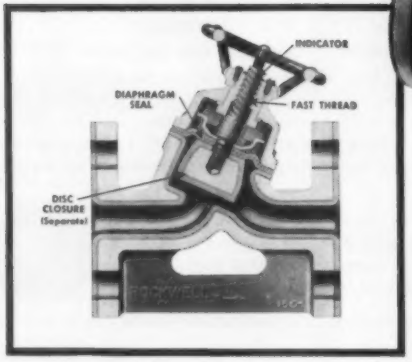

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DATA FILE

(Begins on page 250)

477 Protective Clothing—Catalog 12000, 12 pp, describes and illustrates company's line of industrial clothing for protection against water, fire, acids and alkalis, slipping and scuffing. Various types of work gloves and suits and coats are featured, and protective features and advantages of this equipment are pointed out. The B. F. Goodrich Co.

478 Neoprene Design Book—This illustrated Bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures. Elastomers Div., E. I. du Pont de Nemours & Co.

479 Brinemaking Manual—Details on modern brine-making methods and equipment are presented in 12-pp Manual 135. Three types of brine-makers are described, as well as a wet salt storage system and cutaway views and diagrams are included. Morton Salt Co.

480 Air Conditioning System—Eight pp Bulletin 121 describes an air conditioning system which supplies fresh air with moisture removed in the summer and added in winter, under control that is maintained in "in between" seasons. Niagara Blower Co.

481 Humidification For Profit—Sixteen-pp Bulletin 500 presents data showing how relative humidity affects hygroscopic materials, health and comfort, and formation of static electricity. Schematic diagrams and sectional drawings demonstrate operation of electrically and air operated steam humidifiers. Armstrong Machine Works.

483 Research Facilities—Twelve-pp Brochure 103-2M-956 describes research facilities available to industry on a contract basis. Services offered by this outside research staff in chemistry, chemical engineering, physics and mechanical engineering are explained, accompanied by case histories of recent research and development projects. Research Div., The Fluor Corp., Ltd.

484 Drill Press—Description and specifications on a 20-in. drill press for production tooling and general use are featured in Bulletin AD-1011. Describes heavy-duty construction, large capacity and special features that make tool ideal for mass-production work. A table lists speeds, feeds and capacities, and accessories are given. Rockwell Mfg. Co.

The easiest—and quickest—way to order bulletins and catalogs described in this magazine is to use the postage-free Reader Service Cards on pages 245-246.

All you need to do is circle the item numbers of those you want. Then fill in your name, job title, company name and address—and mail the card.

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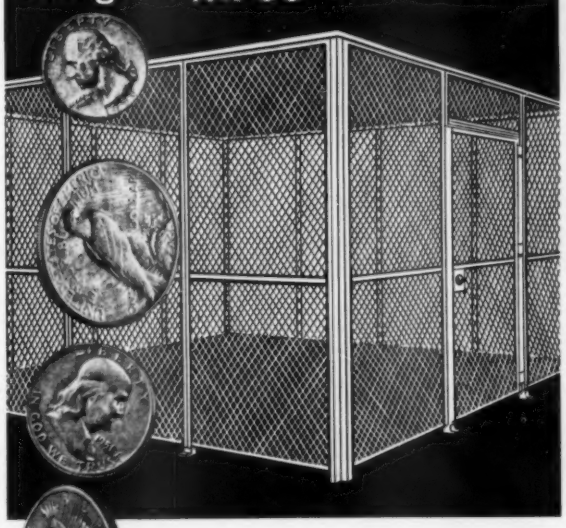

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For low-cost installation, maximum flexibility and minimum maintenance, WIPCO wire partitions are your best bet! They provide a rigid wall which permits the passage of light and vision—allows full circulation of air for heating and ventilating. Easy and economical to erect, your own men can put them up!

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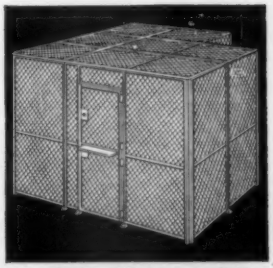

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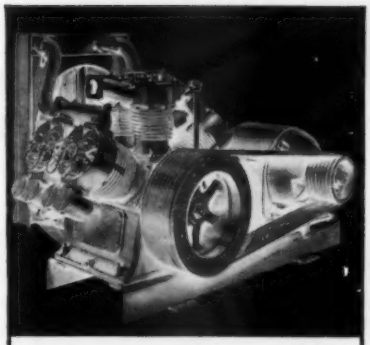

Reduce compressor maintenance problems . . .

with Le Roi air-cooled compressors

Efficient Le Roi two-stage air compressors are lightweight, compact, easily installed anywhere in the plant.

They're air cooled, too! That means:

- *No rusted radiators*
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- *No thermostat troubles*

Replace your problem air compressor with a Le Roi — the latest engineering development in its size class. Available in 50, 75, and 100 hp sizes and displacements up to 548 cfm at 125 lbs. pressure. Tell us your air problem . . . we'll gladly suggest an installation. No obligation, of course!

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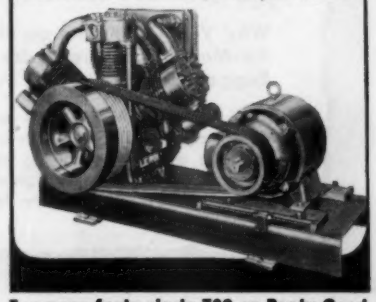

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How Hartzell Duct Fans Help Cut Ventilating Costs

Lower Equipment Cost

Hartzell fans are competitively priced . . . yet they're designed and built for maximum reliability and long life. When you compare prices, estimate the service life of each make and rank them on the basis of cost per year of useful life. On that basis, Hartzell fans will always be by far your best buy.

Lower Installation Costs

Hartzell duct fans are much easier to install than many other types of ventilating equipment which might be used to do the same air-moving job. Each fan is a completely pre-fabricated duct section. To install a Hartzell duct fan you need only cut a section of duct work the same length as the fan, bolt angle iron flanges to the duct ends and bolt the fan to the flanges. After that, just install bracing and make electrical connections and you're done. Easy installation means fast installation . . . and real savings on costly labor charges.

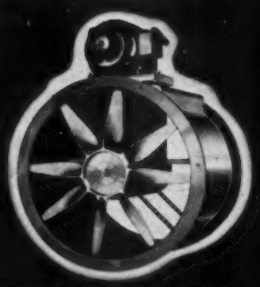
Lower Maintenance Costs

Hartzell duct fans require practically no maintenance. Their rugged construction and the high standards of quality in workmanship and materials to which they must conform practically eliminate failures under normal operating conditions. Routine maintenance requires nothing more than periodic lubrication and occasional replacement of belts. Motors on direct-drive models and bearings on belt-drive models are Alemite-lubricated from outside the duct. Belt changes or adjustments on belt-drive models are also conveniently made from outside the duct. Hartzell design and construction holds maintenance to a minimum . . . and that's a vital consideration under today's wage scales.

For complete details on Hartzell duct fans and how they can help you cut your air-moving costs, just call your nearby Hartzell field engineer. If you don't know him, just drop us a line for his name and address. And be sure to ask for Bulletin A-109.

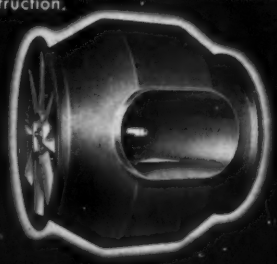
Why You Can Count on Hartzell Air-Moving Equipment for Long Life, Rugged Reliability and Minimum Maintenance

Hartzell fans and blowers are engineered and built for the exacting requirements of tough industrial service. There's no compromise with quality for the sake of shaving a few dollars on price. Hartzell fans are designed for the industrial buyer who is willing to pay for long life, dependable service and low maintenance.



BELT DRIVE DUCT FAN

These fans are the best choice for most installations where air (including that containing fumes, corrosive elements or dust) must be moved through a duct. Fourteen sizes, 12" to 60" fan diameters; single-propeller, two-propeller or multi-blade models in belt-drive or direct-drive construction.



BI-PASS DUCT FAN

This special model, with motor mounted in a tunnel completely out of the air stream, is designed for moving corrosive fumes and air at temperatures as high as 550° F. Six sizes, 19" to 41"

REVERSIBLE DUCT FAN

This fan moves air in either direction with equal efficiency and can be supplied with controls for manual or automatic reversal. It is useful in many ventilating applications as well as in cooling and drying processes. Four sizes: 18" to 44".

HARTZELL
PROPELLER FAN CO.
Div. of Castle Hills Corp.

300 Thomas Blvd. • Piqua, Ohio

ENGINEERING OFFICES IN PRINCIPAL CITIES

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Waukesha Motors' ASTM unit for determining knock characteristics by the supercharge method—ASTM D-909. Staynew filter, Model CPHB-01 (circled and inset), has been used on Waukesha-built, knock-rating engines since inception of the test method in 1942.

STAYNEW FILTERS

choice on Knock-Test Engines

The knock-rating engine built by the Waukesha Motor Company, used to determine octane values of aviation-type gasolines in industry, refineries, and research laboratories, is equipped with a Staynew filter, Model CPHB-01.

The CPHB-01 is a pressure-type filter designed for installation in horizontal pipelines handling air or other gases. Its maximum working pressure is 125 psig, an effective surplus over the 100 psig used in the Waukesha-built ASTM supercharge unit.

This filter effectively removes dust, moisture, dirt, pipe scale, and other foreign matter, and the standard filtering medium will remove dust particles as small as three or four microns (0.000156") in size. Special media are available for finer filtration and for temperatures as high as 1300° F. Models of stainless steel, bronze, or other alloys will handle corrosive gases.

Clean air is essential here because, to secure proper results, the engine must be maintained in topnotch condition. Dirty air will upset results because of the dirt's adverse effects on valves, pistons, etc.

Staynew filters have been used on Waukesha-built supercharge knock-testing engines ever since their inception in 1942. Only minimum maintenance is required.

Whatever *your* filtering problem, there's a Dollinger representative nearby ready to help solve it. Write today. The Dollinger Corporation, *55* Centre Park, Rochester 3, New York.

REG PROTECTOMOTOR U.S. PAT. OFF.

STAYNEW FILTERS

DOLLINGER

LIQUID FILTERS • PIPE LINE FILTERS • INTAKE FILTERS • HYDRAULIC FILTERS • ELECTROSTATIC FILTERS • MIST COLLECTORS • DRY PANEL FILTERS • SPECIAL DESIGN FILTERS • VISCOUS PANEL FILTERS • LOW PRESSURE FILTERS HIGH PRESSURE FILTERS • AUTOMATIC VENTILATION FILTERS • NATURAL GAS FILTERS • SILENCER FILTERS

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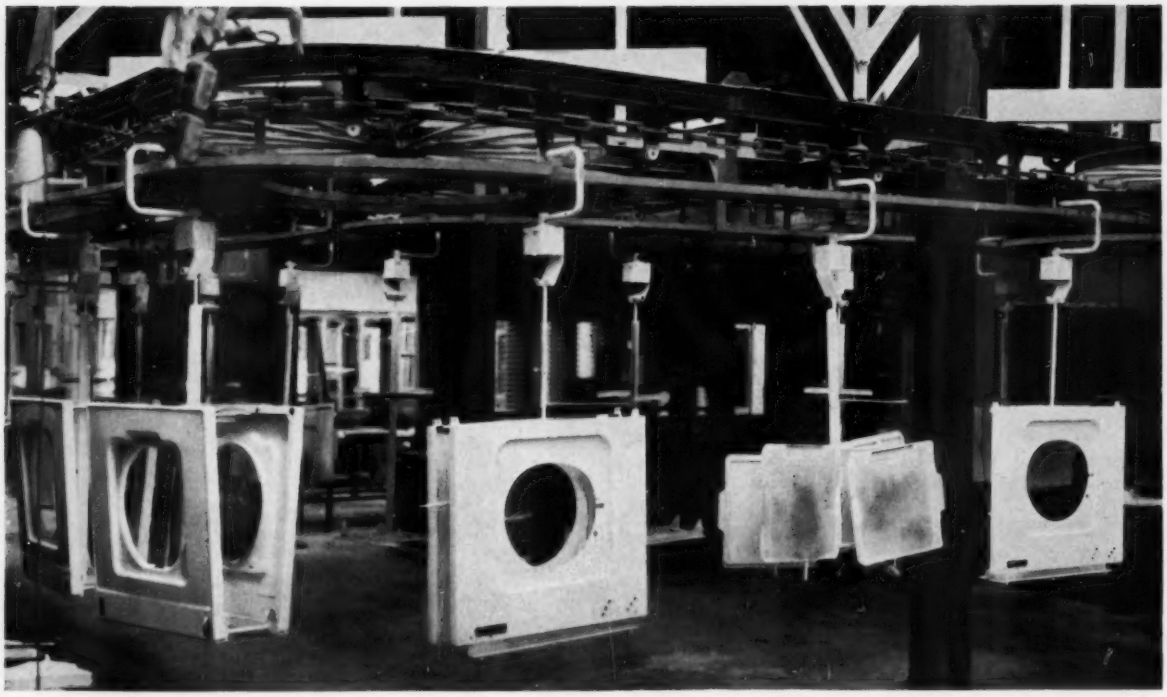

15-mile-long overhead storage conveyors move parts for General Electric Filter-Flo® Washers and Dryers

Minimum inventory carried on floor. Thousands of ball bearings lubricated with Texaco Multifak 2 for three and one-half years with minimum maintenance.

These modern storage conveyor systems are located in Building #1, the Home Laundry Department at General Electric Major Appliance Division, Louisville, Kentucky. Their total length is 15 miles.

As components for General Electric Washers and Dryers are manufactured they are routed through the conveyor system overhead, avoiding floor storage and are directed to required assembly points as needed.

Thousands of ball bearings equipped with sealed pressure grease fittings assure smooth conveyor movement. All of these are lubricated with *Texaco Multifak 2*—except those which operate through high temperature paint and enamel baking ovens which requires a synthetic lubricant.

This is a good example of the way Texaco Lubricants and Lubrication Engineering Service are helping industry everywhere keep maintenance costs low and production high. Why not find out how Texaco can help you?

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, New York.

TEXACO

TEXACO Lubricants, Fuels and Lubrication Engineering Service

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The magazine that helps plant engineers with their everyday problems

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